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Feasibility of and steps towards the creation of a commodity exchange in Bhutan

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The World Bank

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**FEASIBILITY OF
AND STEPS TOWARDS
THE CREATION OF A
COMMODITY EXCHANGE
IN BHUTAN**

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Thimphu, Bhutan
15 June 2015

Contents

Abbreviations	iii
Executive summary	iv
Introduction – the scope of the mission	1
1. The state of agriculture in Bhutan	2
A. Overview of the agricultural sector	2
B. Perspectives of the Bhutanese government on future agricultural sector development	5
C. A regional perspective: trade flows and infrastructure Constraints	6
D. Market structures for key commodities	9
2. Possible contributions of a commodity exchange in developing Bhutan’s agriculture	12
3. Tailoring a commodity exchange to Bhutan’s conditions	18
A. Proposed system architecture for the BCE	18
B. Managing physical flows under the new electronic system	19
C. The differences between the electronic warehouse receipt system and the exchange trading engine	23
D. FCBL’s stock management system versus an electronic warehouse receipt system	26
E. Managing risk in the new electronic system	27
F. The exchange as a tool for government agricultural subsidy Policies	29
G. The potato case: transition from auction yard practices	30
H. Contracts that can be introduced	30
I. Key actors and their potential roles	33
J. Technology issues	38
K. Ownership and governance issues	39
4. Operational challenges for commodity exchange development	42
A. Conceptualisation	43
B. Implementation	45
C. Start-up	47
D. Maturity	48
5. Cost/benefits of a Bhutan Commodity Exchange	49
A. Costs	50
B. Revenues	51
C. Cash flow perspectives and cash flow risk management	53
D. Investment requirements	55
E. Risks	56
Conclusions and next steps	59
Annexes	
1. Terms of reference for the World Bank Bhutan Commodity Exchange mission, March 20 – April 4 2015	66
2. Operating an exchange-approved public warehouse: operational implications	68

Abbreviations

ADB	Asian Development Bank
AMEPP	Agriculture Marketing and Enterprise Promotion Program
BAFRA	Bhutan Agriculture and Food Regulatory Authority
BCCI	Bhutan Chamber of Commerce and Industries
BDBL	Bhutan Development Bank Ltd.
BCE	Bhutan Commodity Exchange
BEA	Bhutan Exporters Association
CARLEP	Commercial Agriculture and Resilient Livelihoods Enhancement Project
CEO	Chief Executive Officer
CGIAR	Consortium of International Agricultural Research
CIAT	International Center for tropical Agriculture
COO	Chief Operating Officer
COSOP	Country Strategic Opportunities Programme (IFAD)
CSO	Civil Society Organisation
CVCA	Climate Vulnerability and Capacity Analysis
DAMC	Department of Agriculture Marketing and Cooperatives
DoA	Department of Agriculture
DoT	Department of Trade
ERP	Enterprise Resource Planning
FAO	Food and Agriculture Organisation
FCBL	Food Corporation of Bhutan Ltd.
FYP	Five Year Plan
GDP	Gross Domestic Product
GNH	Gross National Happiness
GNHC	Gross National Happiness Commission
IFAD	International Fund for Agriculture Development
IFC	International Finance Corporation
IRR	Internal Rate of Return
KM	Knowledge Management
MAGIP	Market Access and Growth Intensification project
MDGs	Millennium Development Goals
MoAF	Ministry of Agriculture & Forests
MoEA	Ministry of Economic Affairs
M&E	Monitoring and Evaluation
NPHC	National Post Harvest Centre
OSFS	One stop Farmers Shop
PPP	Public Private Partnership
RAMCO	Regional Agriculture Marketing and Cooperative
RGoB	Royal Government of Bhutan
RICB	Royal Insurance Corporation of Bhutan
RMA	Royal Monetary Authority
RNR	Renewable Natural Resources
RSEB	Royal Security Exchange of Bhutan Ltd
SAMS	Sersang Agricultural Marketing Services
SME	Small and Medium Enterprise
SNV	SNV Netherlands Development Organisation
ToR	Terms of Reference
ZEC	Zero Energy Cold Storage

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Executive summary

In 2012, 62.2% of the Bhutanese depended directly on agriculture. The sector's share in GDP was just 13%. Agricultural sector growth in 2005-2010 was only 1.54%, compared to the goal of the Tenth Five Year Plan (2008-2013) of 4%. One sixth of the rural population was classified as poor, compared to less than 2% for the urban population. Young people and in particular young men, seeing no future in agriculture, are migrating to the cities. Meanwhile, Bhutan's dependence on imported foodstuffs is increasing.

The 11th Five Year Plan (2013-2018) recognizes that the development of the agricultural sector has been slow, threatening the fight against poverty and increasing the country's reliance on imports of agricultural products. To reverse the trend RGoB has now accorded highest priority to agricultural development. A move from subsistence agriculture to commercial agriculture is the central part of its policy. The Plan identifies as key mechanisms for this transition the building of a comprehensive marketing system to ensure commercial viability of agricultural products; and the facilitation of core institutional linkages towards the commercialization of agriculture.

In this light, the RGoB started work in May 2014 on the feasibility of a Bhutan Commodity Exchange (BCE), under a committee chaired by Royal Monetary Authority (RMA) and actively supported by RSEB. Such an institution, if implemented successfully, will empower private sector actors in the commodity space, provide a backbone for post-harvest finance, and act as a marketing conduit not just for traditional commodities to nearby markets (Bangladesh, India), but also for long-distance trade in niche commodities.

Difficult market conditions discourage commercial agriculture. Under current arrangements, farmers sell much of their main orchard crops (oranges, apples, cardamom) months before the harvest, which secures their market and their revenue but prevents them from getting the best price for their produce. And for other crops, farmers often have to travel to a far-away town in the hope of finding a buyer for his or her goods. The proposed exchange directly tackles these constraints. Through its network of warehouses, the exchange will effectively link farmers to modern output and finance markets. Farmers can bring their produce to a nearby exchange-approved warehouse, where an (electronic) warehouse receipt will be generated representing this produce. They can then put up the receipt for sale through an electronic network; and/or they can use it as collateral for bank loans, which will be distributed by the warehouse operator as agent for a bank.

The exchange's electronic system can link together the many warehouses that FCBL operates throughout Bhutan, as well as warehouses managed by others such as the National Post Harvest Centre (NBPC). In the beginning, the exchange can focus on two commodities, potato and cardamom, apples can be introduced after, and there is a range of niche commodities that also suggest interesting prospects for exchange trading.

The case of potatoes illustrates well how a commodity exchange can benefit farmers and buyers alike. Exports are now through auction yards managed by FCBL. The auctioning system, when introduced, was certainly an improvement over the earlier informal trading channels, but with the growth of Bhutan's potato exports, the auction yard system is visibly in need of overhaul. The auction yards can no longer cope with the volumes of exports: during the busier export months, long lines of trucks await their turn, with farmers forced to spend significant amounts on lodging and food

during the one week or longer the sale of their potatoes can take. Furthermore, the auction system does not permit farmers to optimize the timing of their sales – in most years, prices increase strongly as the season progresses, yet farmers in need of ready cash sell much of their potatoes early on (empowering them to sell on average one month later would have increased their revenue on average 8% over the period 2010-2014). Shifting potato trade to an exchange platform would tackle both issues at once. It would furthermore reduce the transaction costs in the potato value chain – and likewise that of other commodities. The exchange will not only permit more efficient sales. As the exchange platform will also contain bids by buyers, for example processors in search of raw materials, schools and other institutions in search of suppliers, or exporters who try to aggregate the volumes necessary for an international transaction, it will also help pull farmers into commercial markets.

The exchange is conceptualized as an interlinked network of delivery locations, with farmers mostly delivering their produce to upcountry warehouses. On delivery, an electronic warehouse receipt representing the produce is created, and this receipt can be sold through the exchange platform (where a panel of national and international buyers will see the offers for sale and competitively bid to win deals), and/or used as collateral for warehouse receipt loans. Potatoes and other commodities can be stored in upcountry warehouses until there is a buyer, and then they are transported from these warehouses to the delivery locations – the auction towns at the border as well as Bhutan's big cities – under the responsibility of FCBL.

In the Bhutanese context, the *raison d'être* of BCE should first and foremost be to act as a mechanism to facilitate physical trading, and secondarily, as a mechanism to improve access to finance for the commodity value chain. The overall systems architecture, the components necessary to make it work, BCE's exact operations, and the roles and responsibilities of key stakeholders, all should be defined around this overarching goal.

This implies that BCE should provide under its platform two back-to-back software systems. Firstly, an electronic warehouse receipt system which will act as a platform to finance commodity stocks, as a conduit to and delivery mechanism for the exchange trading system, and as a tool to sell commodities that are not standardized enough to meet exchange requirements. Secondly, an electronic trading system that allows a relatively wide group of market participants to buy and sell standardized commodity contracts. The first system has to be procured afresh (unless if one is very confident that it can be developed by programmers in Bhutan); internationally, it should be available for less than US\$ 100,000 (note that the warehouse stock accounting system that is being developed by FCBL will be a good platform to manage FCBL's risks as a warehouse operator, but it does not offer the trading and financing functionalities of a proper electronic warehouse receipt system). The second would normally be rather expensive, possibly too much so for a small economy like Bhutan. But fortunately, the Royal Securities Exchange of Bhutan (RSEB) has an electronic trading system that on the face of it can be adapted to create a commodity trading platform, at a relatively modest cost.

A range of activities are necessary to make the proposed BCE accessible to potential users, and to ensure that these users will see BCE as a solutions provider that they can trust. A brokerage system has to be developed, as an intermediary between the exchange and its users. Rules and procedures need to be elaborated for everything from the delivery mechanism to the resolution of conflicts between those using the exchange. Standards need to be set on the quality of products and on the performance to be expected from warehouse operators and transport companies. Financial procedures have to be put in place to secure the trades done on the

exchange, which in turn enables the exchange to guarantee the performance of every transaction done through the exchange platform. Stakeholders in the commodity sectors where the exchange wishes to introduce contracts – potatoes and cardamom will be the first two – need to be consulted to ensure that contract specifications best meet their requirements, and that they are ready to start using the exchange. International experiences indicate that in the best case, all these activities take up 10-12 months, meaning that if the BCE initiators want to be operational in time for the 2016 potato season – around 1 July 2016 – there is not much time left.

A commodity exchange plays a special role in an economy. Among other things, the prices that are discovered on the exchange influence prices throughout the country – experience in other countries is that one of the main positive impacts of an exchange on farmers is that their bargaining position strengthens because of the greater price transparency. Given this role, governments should not lightly give a company the right to call itself “commodity exchange”. The name is normally protected, and companies allowed to operate a commodity exchange should either meet a comprehensive set of criteria set out in a licensing regime, or be created under a government decree with a clear set of deliverables. If it wishes a commodity exchange to be created, Bhutan’s authorities have to decide under which regime it will operate.

The proposed BCE would directly address significant bottlenecks in the marketing and financing of Bhutan’s main crops. Neighbouring India shows the precedent of how this could improve farmers’ prices. According to the Government of India’s Economic Survey 2009-2010, spot exchanges in the country had introduced trade in a wide range of commodities, and “in the process, farmers’ realization has increased by 4-5%.” The warehouse receipt finance introduced alongside the commodity exchanges had also led to a significant increase of agricultural finance, with billions of US\$ new money being lent to farmers, processors and traders, and interest rates considerably below those that earlier prevailed. It is likely that a successful BCE would have a similar economy on Bhutan’s agriculture.

But while an exchange is likely to be beneficial for Bhutan, the exchange only captures a small part of such benefits. So could it be self-sustaining in a small country like Bhutan? Analysis shows that, as long as a lean business model is adopted, exchange implementation is managed smoothly, BCE is able to leverage on the existing trading technology of RSEB to procure a very low cost trading platform, and BCE’s technology costs are partly subsidized by international donor support (as seems likely), then an exchange can become sustainable. Using fairly conservative assumptions, the maximum negative cumulative net cash flow would be half a million US\$, so BCE must have the initial capital to absorb such costs until it reaches operational break even – which would be in its second year of trading. By its 4th year of trading, investors will have earned back their original outlay. Profit levels after this are good, and investors could even start considering an IPO. And the then-mature exchange will be able to introduce a broad range of contracts that will continue supporting the development of Bhutan’s commodity sector in the years to come.

Introduction – the scope of the mission

Following a World Bank pre-assessment mission in December 2014 on the scope of a commodities exchange in the Kingdom of Bhutan, terms of reference (see Annex I) were prepared for a follow-up mission to further examine the feasibility of such an exchange, and set out a roadmap for its establishment.

This follow-up mission took place in from 20 March to 3 April 2015. The mission was by Mr. Lamon Rutten (consultant), who was accompanied in all his meetings by Mr. Johann Rusche, placed by the Gross National Happiness Commission as consultant to the Commodity Exchange Initiative with the Royal Securities Exchange of Bhutan. This is the report of that mission.

During the mission, the team met with officials of the Gross National Happiness Commission, the Royal Securities Exchange Ltd. (RSEB), the Food Corporation of Bhutan Ltd. (FCBL), the Royal Monetary Authority (RMA), the Bhutan Development Bank Ltd. (BDBL), the Department of Agricultural Marketing and Cooperatives (DAMC, part of the Ministry of Agriculture and Forests, MoAF), the National Post Harvest Centre (NPHC), the National Seed Centre, the Bhutan Exporters Association (BEA) and the Royal Insurance Corporation of Bhutan (RICB). They also met with a team from the International Fund for Agricultural Development (IFAD) which was in the country to finalize its “Commercial Agriculture and Resilient Livelihoods Enhancement Programme” (CARLEP), which has complementarities with the work that would have to be done for establishing a successful commodity exchange. The mission visited cold storage warehouses in the environments of Thimphu and Paro and visited the FCBL headquarters, the headquarters of the only private sector auction yard, and the FCBL auction yard in the city of Phuentsholing. The preliminary findings of the mission were presented at a stakeholders meeting on Friday 3 April, and the comments from this meeting were reflected in this report.

As part of the efforts of the Royal Government of Bhutan (RGoB) to accelerate growth in the agricultural sector, it created in May 2014 a working committee to support work towards the possible establishment of a commodity exchange in the country. The members of the Commodity Exchange Committee are the Gross National Happiness Commission, BDBL, the Bhutan National Bank Ltd., DAMC/MoAF, FCBL, RICB, RMA, and RSEB. While RMA was entrusted the chairmanship of the Committee, RSEB took on the responsibility of managing the programme of work. Significant work was done under the guidance of the Committee from 2014 onwards, and this report has profited greatly from this work.

The structure of this report is as follows. First, the state of agriculture in Bhutan is discussed, with a particular focus on the market- and finance-related constraints to agricultural growth. Then, the possible contribution of a commodity exchange towards alleviating these constraints is explored: an exchange can address weakness both in physical trade and in agricultural finance. The third chapter then describes in some detail how an exchange can be tailored to Bhutanese conditions, in particular with regards to the interplay between a warehouse receipt system and a trading system. Possible contracts, key exchange actors, technology issues and governance are also discussed in this chapter. Chapter 4 analyzes the operational challenges for commodity exchange development in Bhutan, from physical market issues to regulatory constraints to infrastructural weaknesses and lack of knowledge. In Chapter 5, the cost and benefits of a commodity exchange for Bhutan are set out, and the financial aspects of setting up an exchange are considered. A concluding section discusses next steps.

Chapter 1 THE STATE OF AGRICULTURE IN BHUTAN

A. Overview of the agricultural sector

In 2012, 62.2% of the Bhutanese, with an overrepresentation of women¹, depended directly on agriculture – out of a population of some 700,000. The sector's share in GDP was just 13%, and has been declining over the years. Crops account for around half of agricultural GDP, and livestock and forestry each for around a quarter. Whereas the Tenth Five Year Plan (2008-2013) aimed for an annual growth of 4%, actual growth in 2005-2010 was only 1.54% (compared to 7-8% overall GDP growth, until a slow-down in 2012).² Poverty is concentrated in the countryside: 16.7% of the rural population is poor, compared to 1.8% for urban poverty. Still, Bhutan has been successful in combating poverty – the percentage of poor was cut in half from 2008 to 2012, and extreme poverty was almost eliminated.³ Young people and in particular young men, seeing no future in agriculture, are migrating to the cities. This is resulting in land being left fallow, and labour shortages (which have become one of the leading constraints in agriculture). It is expected that by 2020, Bhutan will be 60 percent urbanized. Meanwhile, Bhutan's dependence on imported foodstuffs is increasing.⁴

In the Eleventh Five Year Plan (2013-2018), the lagging performance of agriculture is seen as a significant obstacle for poverty reduction, and for achieving equitable and sustainable economic growth. The Government recognizes that in order for agriculture to grow, farmers need to move from subsistence agriculture to commercial agriculture.

More than half of the cultivated area is dedicated to cereals, among which rice and maize dominate. About three quarters of the households in Bhutan engage in rice production, producing on average 2.5 tons of paddy each – collectively, they meet around half of the national demand for rice. They mostly produce red rice, of higher value than the white rice that Bhutan imports. Maize, often intercropped with potatoes, is produced by some 70% of farmers (mostly in the East). The main cash crop, oranges, comes next in terms of production volume; orange orchards can mostly be found in the South of the country. The second largest fruit export is apples, mostly produced in the Dzongkhags (districts) of Haa, Paro and Thimphu, in the West. In terms of value, arecanuts (also called betel nuts, as they are commonly

¹ Gross National Happiness Commission, Royal Government of Bhutan, Eleventh Five Year Plan, 2013-2018, Volume I: Main Document, 2013. 62% of Bhutanese women work in agriculture, and 70% of the land is owned by women. As per Labour Force Survey 2012, 62.2 percent of those employed were in RNR with 23.9 percent male and 38.4 percent female (<http://www.fao.org/Gender/files/bhu.pdf>)

² See Eleventh Five Year Plan, Table 3.1.

³ The World Bank, "Bhutan: Country snapshots", March 2014.

⁴ This is not to suggest that Bhutan should aim for food self-sufficiency. Apparently, some government officials, in a misguided search for food autarky, believe that where possible, farmers should grow rice. For example, "due to the profitable earnings of the cash crops, many of the landowners especially near the roads have started converting their paddy fields into orchards to the extent that the government had to pass a law prohibiting such practices." (S. Tobgay, Agriculture Diversification in Bhutan, International Association of Agricultural Economists Conference, Gold Coast, Australia, 12-18 August 2006) And more recently, "agriculture officials said food security is a concern, so paddy land should be used for cultivating rice" (quoted in *Cardamom plantation in once paddy fields*, Kuensel Online, 12 March 2014). But as farmers themselves note in this same article, income from cardamom is much higher than that from rice, and "it's convenient to buy rice from India."

chewed wrapped in betel leaves), potatoes and other roots and tubers follow oranges at some distance (see Table 1). Cardamom is not reported separately in the FAO statistics, but it is mostly grown for exports; official exports were 650 tons in 2013, valued at US\$ 10 million, and unaccounted export sales were for a similar or larger amount.⁵ Cardamom is mostly cultivated in registered cardamom orchards, on slopes that are unsuitable for growing other crops at heights between 900 and 2000 meters.

Another important product is cordyceps, which is a mushroom, or more exactly a fungus growing out of a caterpillar, collected in the wild of the Tibetan plateau, at heights between 3,000 and 5,000 meters, for which there is a booming demand from China, Singapore and Western countries, particularly from the alternative medicine market.⁶ Bhutan has good potential in niche market products such as fresh mushrooms, hazelnuts, lemongrass/lemongrass oil and medicinal plants, some of which are now being grown or collected in small quantities; if secure markets can be created and farmers can receive advice on how to better manage production risk, they can scale up their production.

Smallholders dominate agriculture: 40% of rural households own 1 ha (2.5 acres) or less, another 30% have between 1 and 2 ha; only 8% of farming households own more than 4 ha. Agriculture is risky: Bhutan is prone to landslides, earthquakes and drought, and wild animals each year destroy many farmers' crops. Those farmers who sell to the market are confronted with highly volatile prices, partly caused by conditions on Indian markets. Almost 80% of farmers live on subsistence agriculture, broadly defined (ie, farmers sell occasional surpluses, but do not grow for the market). For example, only 3.6% of rice production is marketed, and only 1% of maize. For export-oriented crops (potatoes, fruits and vegetables, spices and nuts) market surpluses are higher, but only 15% of cropped acreage is dedicated to these crops. Still, even for these crops, most produce is sold on local markets, and in all,

Table

Main crops produced in Bhutan, 2013

	Area harvested, ha	Production, tonnes	Value (est.), mIn US\$
Rice, paddy	21,287	78,730	81
Maize	24,860	64,868	19
Oranges	5,500	49,069	41
Potatoes	3,927	41,629	16
Other roots & tubers	2,350	25,000	17
Other citrus fruit	2,300	18,000	6
Chillies and peppers, green & dry	5,675	16,062	21
Sugar cane	480	15,000	N.A.
Apples	2,007	14,174	23
Areca nuts	10,000	10,500	22
Wheat	2,270	5,310	2
Spices	635	5,000	N.A.
Ginger	948	3,405	6

Source: FAOSTAT. Values have been estimated on the basis of the producer prices reported in FAOSTAT for 2012, the latest available year, and using the average exchange rate for 2012 as reported by The World Bank.

⁵ <http://www.drukhorticulture.com/cardamom/>

⁶ In 2014, according to the Department of Agricultural Marketing Cooperatives, 672 kg of cordyceps was collected, with a value of Nu 470 million (around US\$ 8 million). 555 kg were sold through auctions (at 11 different auction sites). (see <http://www.thebhutanese.bt/nu-470-mn-worth-cordyceps-collected-in-2014/>) However, unreported exports are said to exceed the reported sales.

less than 5% of Bhutan's crop area is used for exports.⁷ As share of total exports, agriculture only accounts for 5%, after hydropower and minerals.

Agricultural growth is constrained by Bhutan's mountainous terrain. Only 2.9% of the country's land is used for crop agriculture, and another 4% as pastures – three quarters of farming households own livestock. The scope for bringing more land under cultivation is limited⁸; in fact, urbanization is putting considerable pressure on agricultural land. Production growth mostly has to come from yield improvements, which would imply a reversal of past trends – from 1982 to 2009, yields per hectare have been declining at a compounded annual rate of 1.84%.⁹

The difficult terrain not only isolates villages from public services, but also from markets. The prevalence of poverty is higher in geogs (village blocks) with poorer road networks.¹⁰ It has been found that where new roads have been constructed or roads are improved, farmers respond by increasing the production of market-oriented crops, especially potatoes.

Although for maize and rice yields in Bhutan are broadly comparable with India, judging from the large differences in yield across the country's districts, there is scope for improving yields in many crops (by use of improved seeds, more inputs, mechanization, and in some cases even through the introduction of a second crop season during the year). There is also large scope for reducing post-harvest losses. Potato yields are only half of those in India; in the current Five Year Plan, the Government hopes to reduce this gap, and increase production from 3.34 tons/acre to 5 tons/acre.

However, farmers have little incentive to improve their practices if they have no certainty of being able to market their produce at reasonable conditions. At the same time, low levels of marketable surpluses oftentimes discourage the private sector from building value chains that link farmers to markets. This is, however, changing somewhat as private sector investors are developing processing plants (eg, for hazelnuts, fruit juices or areca nuts) that seek to develop backward linkages with farmers, so as to secure their supply of raw materials. Relatively few farmers will be able to benefit from such initiatives, though, and there remains much scope for various actions of the government to organize farmers to collectively engage in marketing, and to improve the marketing system in the country.

The potential export market for Bhutanese produce is large. India and Bangladesh in particular offer vast markets for vegetables (including potatoes), fruits and spices – and potentially also for produce new to Bhutanese farmers (for example, in Sikkim, with growing conditions similar to Bhutan's, many farmers have diversified into ornamental plants). Bhutan has bilateral trade agreements with both countries. In the case of India, a free trade agreement allows free movement of all goods and services between two countries without any import/export duties, except for a number of critical goods mentioned in negative lists. In the case of Bangladesh, a preferential

⁷ IFPRI, "Agricultural trade in Bhutan: patterns, trends, and impact", Agricultural and Food Policy Research and Capacity Strengthening Project, July 2010. Note that statistics on exports for crops other than potatoes are unreliable, as trade is mostly through informal channels and exports are not properly recorded.

⁸ Already, 31% of agricultural land is located on slopes of more than 50 degrees (Eleventh Five Year Plan, Main Report, Section 5.5.2).

⁹ Sanjeev Mehta, "Growth Crisis in the Bhutanese Agriculture Sector: Exploratory Analysis of the Causes", Royal Thimphu College, 2012.

¹⁰ National Statistics Bureau and World Bank "Poverty Map of Bhutan: Key Findings" (2010).

trade agreement specifies duty exemption for 18 products, mostly agri-based. Furthermore, consumer preferences in these countries are changing, with more buyers keen to buy high-quality produce (eg, free of noxious chemicals) all year round through organized market outlets (in particular, supermarkets) – the “Bhutan brand” should thus stand Bhutanese exports in good stead. Bhutanese produce comes to the market in the Bangladeshi/Indian off-season (in summer and autumn), when prices in these markets are starting to increase, and with fairly simple storage techniques Bhutan should be able to supply its produce during the months that prices in these markets are at their highest.

B. Perspectives of the Bhutanese government on future agricultural sector development

The 2013-2018 Eleventh Five Year Plan recognizes that the development of the agricultural sector has been slow. This, in turn, has increased the reliance on imports of agricultural products, leading to a significant current account deficit with India. The management of the Rupee shortfall resulted in a credit crunch, a key contributor to the economic downturn that Bhutan faced after 2011/12. Thus, “realising the importance of the agriculture sector and its significance for poverty reduction and equitable and sustainable economic development, RGoB has accorded highest priority to agriculture development in the 11th Five Year Plan and agriculture is featured as one of the five jewels.”¹¹

According to the Five Year Plan, “A key strategy will be to transform the Rural and Natural Resources sector into a commercially viable sector that provides higher returns to the farmers, improves rural livelihood, reduces imports and promotes exports, and offers attractive employment opportunities to youth.” Among other goals, the Five Year Plan targets a doubling of export values and volumes from their 2011/2012 levels to 2018 (to reach Nu. 3.2 billion, approximately US\$ 50 million, for an export of 125,000 tons), and an 80% increase in annual cash income from the sale of agricultural and natural resources products.

So under the Five Year Plan, the transition from subsistence to commercial agriculture is central in Bhutan’s agricultural policy. Furthermore, the Plan identifies as key mechanisms for this transition the building of a comprehensive marketing system to ensure commercial viability of agricultural products; and the facilitation of core institutional linkages towards the commercialization of agriculture. To overcome the problem of a lack of private sector finance (loans outstanding from institutional sources in the farm sector were just 2.23% of all institutional loans in 2012¹²), priority lending schemes for agriculture will be strengthened, and investments in irrigation, storage and communication will be prioritized. Private sector participation throughout the value chain, from input supply to marketing, will be encouraged.

The directions as set out in the current Five Year Plan are fully compatible with the development of a Bhutanese commodity exchange – an institution that empowers private sector actors in the commodity space, which provides a backbone for post-harvest finance, and which can act as a marketing conduit not just for traditional commodities to nearby markets (Bangladesh, India), but also for long-distance trade in niche commodities.

¹¹ “The Five Jewels of Economy: Dzongdas’ Roles” Speech from Lyonchhoen Tshering Tobgay, Prime Minister of Bhutan during the Conference of Dzongdas, Kuensel, August 12, 2014.

¹² Bhutan Statistical Year Book 2013, Table 12.10.

C. A regional perspective: trade flows and infrastructure constraints

Half of the geogs account for 92% of the crop sales in Bhutan. More remote geogs have lower yields and less commercialization. Distance from the road is a major determinant of a farmer's interest in growing for the market: a one hour decrease in walking time corresponds to a 33% increase in the probability of selling farm output.¹³ Transport costs account for a significant part of total production and marketing costs. Despite large investments under the 10th Five Year Plan (2008-2013), with farm roads expanding from a total of 500 km in 2006 to almost 4,000 km in 2013, 31% of the rural population still lives at more than one hour walking distance from the nearest road (under the current Five Year Plan, the goal is to reduce this by half).

The difficult geophysical environment has consequences for an exchange. On the one hand, the potential benefits for farmers of the kind of exchange envisaged for Bhutan is much more significant. Through its network of warehouses, the exchange will effectively link farmers to modern output and finance markets – and in the longer run, perhaps also to input markets. The farmer no longer has to worry about travelling to a far-away town in the hope of finding a buyer for his or her goods¹⁴ - and worry about what will he do if he does not find one (strongly fluctuating prices on rural markets are one consequence of this situation: when traders find a surfeit of farmers on the market looking to sell their produce, they can easily drop prices as farmers have little alternative to selling¹⁵).

Instead in the proposed commodity exchange arrangement, they can bring their produce to a nearby exchange-approved warehouse and put it up for sale, reaching through an electronic network buyers not just throughout the country but international buyers as well. Transport from the goods-receiving warehouse to delivery locations closer to the buyers will be arranged by FCBL (and later on perhaps also other transport companies), which can optimize the use of its transport fleet. The result should be a reduction of transport costs as compared to what a farmer would have had to pay. Moreover, the farmer no longer has to go to the nearest bank office, perhaps more than once, to fill out the forms to obtain a loan – instead, the warehouse operator will act as an agent for the bank and arrange loans against the collateral of the farmer's crops. Bhutanese banks, and in particular BDBL, have already been developing this agency banking concept.

The exchange can benefit from a rather widespread network of warehouses across the country (see figure 1 on next page). Most facilities are under the management of FCBL and are used for the distribution of consumer goods and staple crops. A few entities offer cold-storage services.

FCBL owns and operates one central warehouse in the border town of Phuentsholing (including 100 tonnes cooling facilities) and three break bulk warehouses at its regional offices in Thimphu, Gelephu and Samdrup Jongkhar. From these break bulk

¹³ According to a study by Tobgay and McCullough, "Linking Small Farmers in Bhutan with Markets: The Importance of Road Access".quoted in Garry Christensen et al., "Bhutan agricultural sector review, Volume 1, Policies, institutions and policies, FAO Investment Centre/World Bank, 2012.

¹⁴ Increasingly, Bhutan's farmers are women, but for ease of reading a farmer will normally be denoted as a "he" in this report.

¹⁵ As reported in Sonam Tobgay and Ellen B. McCullough, *Linking Small Farmers in Bhutan with Markets: The Importance of Road access*, Implications of Food Systems Transformation for Smallholder Farmers, 2007.

warehouses goods are distributed to 28 regional depots and godowns, all connected through the Internet. Furthermore, FCBL manages 19 distribution godowns for food commodities that were developed with support of the World Food Programme. FCBL operates a cold storage warehouse in Sisina (50 MT) owned by the Thimphu Dzongkhag administration. In order to operate successfully, FCBL is expecting to open a number of additional depots and godowns in 2015, as well as two new 100 tonnes cold storage warehouses in 2015 and 2016 in the border town of Samdrup Jongkhar (the main gateway from India to the Eastern part of Bhutan) and in Nganglam (also in the South East). FCBL has a risk management system in place for its warehouses, including a policy to rotate staff among warehouses from time to time.

While FCBL's warehouses are traditionally meant for distribution, the National Post Harvest Centre (NPHC), under MoAF's Department of Agriculture, offers extension services as well as subsidized storage facilities to farmers across the country. At its main office in Paro, NPHC operates a refrigerated cold storage (60 MT), fully utilized by farmers in the region for storing apples. Here, farmers are charged a subsidized fee of Nu. 1 per box (20g) per day; without subsidies charges would rise to Nu. 7-8 to cover costs. In this cold storage facility, NPHC has an administrative/risk management system in place to manage third-party storage.¹⁶ It also grades the produce when it enters the warehouse, and discards rejects.

NPHC also manages four 48 tonnes Zero Energy Cold Storages (ZECs) in Paro, Dagapela, Zhemgang, and Pemagatshel. The ZECs are built following technology developed by the Nepalese Farming Institute and offer pre-cooling as well as humidity and temperature control. The ZECs have been tested successfully for the storage of apples (less than 5% weight loss in four months). Charges to cover the operating costs of ZECs are Nu. 0.5 per box per day. The ZECs remain poorly utilized, and for the time being are not connected to the Internet. NPHC is building a new refrigerated cold storage in Mongar with a capacity of 100 MT, to be completed by the end of 2015). NPHC is also attempting to establish cold chains, with a 4 tons refrigerated truck in Paro, and a second one planned for the Mongar region.

In future, the warehousing network can even grow further, in particular through the Farm Shops which the government plans to roll out in the next few years.

The benefits that the exchange network offers to sellers, particularly in the context of Bhutan's difficult terrain and high transport costs, also apply to buyers. In particular for niche commodities, it is now often difficult for traders to obtain commercially attractive volumes. Bhutan Commodity Exchange (BCE) can in the medium term add contracts for such commodities to the initially planned bulk commodities. Furthermore, processors have difficulty sourcing the raw materials to fully utilize their installed capacity. The exchange can operate as an extension of the buying network of such entities, reliably providing them with the commodities that they need.

¹⁶ This system has the basic elements of a warehouse receipt system, inter alia: receipts issued by farmers when they deposit the apples, with one copy held by the warehouse operator (NPHC); registration of the receipts issued each day in a central ledger; marking of the boxes with the names of the depositors; depositors need the receipt in order to take their apples back. In a proper warehouse receipt system, all these elements are reinforced, with a clearer distribution of responsibilities between the different staff at a warehouse, more systematic record keeping (thanks to an electronic system), and so on.

Indicative roadmap of Bhutan with existing storage facilities

- end 2015, mid 2016 respectively)
 - FCBL Depots in Thimphu, Gelephu and S/jongkar are regional warehouses
 - First Farm Shops in Wangdue, Bumthang, and S/jongkar completed by end March 2015
 - Map not true to scale
-



The exchange has to provide for the at times difficult transport conditions. In particular:

- Road conditions have improved much in recent years and by and large, are sufficiently good to operate a nationwide commodity exchange. Nevertheless, certain roads may become difficult during winter months and the monsoon season (July to early September). Landslides are common during the monsoons, with the road at times blocked for two or three days. It is envisaged that the exchange permits, among other things, buyers from one town to buy commodities that are stored in a warehouse in another town, and that then FCBL (at a publicized cost) ships the commodities to a warehouse, factory or shop indicated by the buyer. The delivery conditions have to foresee the possibility of 2-3 days of delay in delivery, and protect the exchange from having to pay any “late fees” for such delays.
- With high transport costs, Bhutan is not “one market” for many commodities – rather, there are regionalized markets. An exchange can tailor a contract to a specific region. For example, in the case of potatoes, it will probably have two potatoes contracts, one for delivery in the West of the country, the other for delivery in the East.

D. Market structures for key commodities

Exchange contracts need to be tailored to the specific conditions in each country for each commodity. Copycat contracts only work in one situation: if they are meant to provide local investors access to an international futures contract. Such “gateway contracts” have been exceedingly successful in India, offering Indian companies and investors access to international metal and fuel contracts. But these are not currently envisaged for the Bhutan exchange, although future possibilities are worth exploring.

One critical aspect that the exchange needs to get right is the accurate definition of product specifications. For example, if too wide a quality range of potatoes is permitted for delivery under one contract (without set premiums or discounts for the commodity, dependent on the variance of the delivered quality with that of the standard), then prices are likely to converge at the level of the lowest quality (because traders will assume that this is what farmers will be delivering). If the lot sizes for trading and delivery (they do not need to be the same) are too large or too small, many people will be discouraged from trading.

Also, the grades chosen for the contract need to conform to the market understanding of grades – in this respect, Bhutan is quite well organized, in that there are common quality standards for 65 commodities, and that the Bhutan Agriculture and Food Regulatory Authority (BAFRA) which issues quality certificates has offices in every district and at every border entry point, and also disposes of an ISO-certified food laboratory. Moreover, BAFRA is reportedly willing to certify even small quantities, of one tonne.

Understanding the specifics of each commodity, including market structures, is important for the exchange because it permits it to better express and illustrate the unique value propositions of the exchange’s product offering. And it can approach prospective exchange users in a targeted manner.

This section gives a broad overview of the market structures for the commodities that the exchange is likely to introduce in its early years. Further work will be necessary to prepare more detailed profiles.

To start with, **oranges** (Bhutan's largest agricultural export and the only one in the top-10 of exports) have the following supply chain:

- A large number of **producers**, primarily in the South of Bhutan to Phuentsholing, the main city of orange trade, interact with...
- a small number of so-called **suppliers** (traders), of which there are some 50 (with the group changing from year to year). These buy from farmers and sell to exporters. The common arrangement is that they enter into (generally) informal agreements with farmers prior to harvest; under which they prepay for the right to harvest all of the produce of the farmer's orchard. From the farmer's perspective, he receives cash several months before the orange harvest starts, and he no longer has to worry about risks for his orchard (eg, wildl animals destroy part of the crop¹⁷). The supplier will do little or no maintenance at the orchard, but shortly before the harvest will bring in guards to protect against theft, and then use contract labourers (often from India because Bhutanese labour is more expensive) for the harvest, the packaging and the transport to collection depots.
- Oftentimes, prior to the season, suppliers sign contracts with **exporters**. In these (generally formal) contracts they agree on how much they will deliver at the time of the harvest. The exporter then provides a cash advance. The exporter grades and repackages the product, and the oranges are sorted into larger and smaller sizes.
- The exporters are members of the Bhutan Exporters Association (BEA) under the Chamber of Commerce & Industry. At the beginning of every export season, the Bhutanese exporters agree on a minimum floor price for the season. BEA organizes locations where **foreign buyers** (importers, mostly from Bangladesh) come and negotiate with Bhutanese farmers and exporters directly to purchase. Virtually all exports are from mid-November to early February.

The marketing systems for **cardamom** (almost entirely destined for exports) and for **apples** are virtually identical to that of oranges. But these crops have one important difference from oranges. Oranges can hardly be stored, so they have to be exported soon after the harvest. But in the case of apples and cardamom, when harvested at the right time and with proper storage, they can be stored for a long time (with cold storage, apples can be stored for up to 11 months, and cardamom, when properly dried, can be stored even longer). This offers interesting marketing opportunities for Bhutanese producers. In the case of apples, one relevant aspect is that Indian retail chains are growing, and have an appetite for premium apples, which they sell throughout the year.¹⁸ An exchange can help form the link between these organized buyers and Bhutanese apple exporters.

Potato "is produced by all kinds of farmers from small landholders to tenant and large farmers. It is grown by all types of farmers from high altitude yak herders to the farmers of the sub tropics".... "For most high altitude rural households, potato is at

¹⁷ Wild animals are a considerable threat to individual farmers' crops, and they have to invest considerable time – many nights – just to guard their farms.

¹⁸ http://www.fftcompany.com/FFT-article-about-Indian-Apple-Storage_2_14.html

present the only economic cash crop available for both, local and export markets.”¹⁹ While most household grow potatoes, only those less than 5km from the nearest road produce for sale to the market. “The potato value chain in Bhutan is very short as most of the functions are performed by potato growers themselves. The involvement of private entrepreneurs (seed and fertilizer agencies), registered transport companies and agro-trade houses is nearly absent or it is at a subtle level.”²⁰ Export sales are through auction yards. While the auction markets were originally set up to encourage diversification into potatoes, ginger and cardamom, they have mostly captured potato exports. 85% of the auction value consists of potatoes, but a number of vegetables like carrots, peas and chillies are also sold through the auctions. Two large auction yards that trade potatoes are operated by FCBL, in Phuentsholing (by far the largest) and Samdrup Jongkhar²¹. Since 2014 there is also a privately-owned auction yard (Sersang Agricultural Marketing Services, SAMS) in Phuentsholing. Marketing arrangements can be summarized as follows:

- Many farmers bring their produce to the market, traveling sometimes for 2-3 days. At times, small traders who have aggregated sales from various farmers also put their produce up for bids. FCBL grades the potatoes delivered by farmers and displays them in its auction yards. Foreign traders, mostly Indian, but also Nepali and Bangladeshi, come assess the quality and quantity offered, and if they are interested in a particular lot they will place a bid. The farmer/seller decides whether to accept the bid or not (but he can only refuse a bid twice, after that he has to take the potatoes back and try to find a buyer outside of the auction system). FCBL charges 3% fee to the seller (discounted to 0% for farmers who sell early in the season) and up to 4% to the buyer for the services it provides during the auction.
- In other cases, farmers do not have the volume to bring their produce to the auction yard, and instead sell to intermediaries (possibly larger farmers) who aggregate volumes to then sell at the auction.
- Many of the buyers make use of FCBL storage facilities, renting them to sort, grade and repack their procured goods, and to schedule the dispatch to their buyers.
- The potatoes sold at the auction are not homogenous. But there is a clear grading system that appears well-understood by traders and farmers alike. Towards the end of the season, sales shift to small potatoes used for seeding, which fetch better prices.
- There is also a large local market for potatoes, with a few organized large buyers (but most local sales are still through weekend markets). In particular, FCBL engages in school feeding programmes, for which it needs among others 1,500 tons of vegetables a year, including potatoes.

¹⁹ Surendra Raj Joshi and Bhim Raj Gurung, “Potato in Bhutan – Value Chain Analysis”, RAMCO/SNV/ AMEPP- PFO/IFAD, December 2009.

²⁰ Idem.

²¹ FCBL operates three auction yards at other border points, but no potatoes were traded there in 2014.

Chapter 2

POSSIBLE CONTRIBUTIONS OF A COMMODITY EXCHANGE IN DEVELOPING BHUTAN'S AGRICULTURE

“A commodity exchange is a market in which multiple buyers and sellers trade commodity-linked contracts on the basis of rules and procedures laid down by the exchange” (UNCTAD, 2009).

Commodity exchanges provide three basic functions: price transparency (everyone has access to a neutral reference price); price discovery (demand and supply developments are readily reflected in price levels); and reduced transaction costs (it is easier to find buyers or supply through a centralized market place). If the exchange offers forward or futures contracts, it also provides a risk transfer function. In addition, exchanges normally help to define better quality standards, speed up the process of product standardization, and improve the discipline in the market place. Exchanges create incentives for market participants to produce commodities that meet exchange specifications, and to behave according to exchange rules. Exchanges are dynamic tools to remedy a country's weaknesses in the market place.

Accordingly, the proposed exchange should be configured to remedy the specific weaknesses of Bhutan's commodity sector. As currently formulated, the goals of the BCE project are

- (i) to commercialize the Bhutanese agricultural sector;
- (ii) to increase commodity margins for Bhutanese farmers due to direct market access, more buyers, and less collusion²², and transparent prices;
- (iii) to integrate smallholders into the market; and
- (iv) to reduce transaction cost and ultimately to improve rural life standards.

It may be useful to consider the key weaknesses of Bhutan's agriculture from a value chain perspective – more specifically, from the absence of properly organized value chains for most products (paddy/rice, where FCBL is making a commendable effort to link farmers to markets, and some of the new processing ventures, such as for hazelnuts, are exceptions). From this perspective, the problem is not primarily that farmers do not grow enough produce for the purpose of selling it to the market; or that transaction costs are too high. Rather, both are symptoms of the absence of structures that permit farmers and organized buyers (processors, exporters, hotels, etc.) to link in an efficient manner. The overriding goal of the exchange, then, would be to provide one such structure (contract farming is the other main structure providing such a link; for commodities and situations with a low risk of side-selling, ie the default by farmers on their delivery obligations²³, contract farming may be the

²² In the case of auction trade, “The traders who come to bid in the auction yards are rumored to form syndicates in order to keep the price low. (...). The general trend during the start of the season shoots off by the traders offering a high price inducing all farmers to bring the harvest to the auction yard thereby creating a temporary glut, thus resulting in a downward spiral of prices due to excess supply at that point in time.” (S. Tobgay, op.cit., 2006)

²³ Side-selling is a problem in contract farming everywhere, and Bhutan is no exception. One should not naively assume that because it is in the long-term interest of farmers to meet their contractual obligations, they will indeed do so. Temptations to make short-term gains are large. For example, in a project in Bhutan to stimulate the sale of foods by farmers' groups to schools and other institutions (a programme that led to significant income gains for farmers), it was found that “both sellers and buyers have at times not adhered to the contract. Farmer Groups of one week have tried to supply more than required at the cost of the Farmer Groups of the following week. Farmer Groups have also tried to supply lesser quality to the institute, while trying to sell the better produce on the local market. Buyers have also bought from parties outside the contract without any good reason.” This is despite

most suited, otherwise exchange solutions are likely to prove more effective). If successful, farmers will benefit (as expressed in the above goals), but so will most of the other players in the value chains as well as end-consumers.

This perspective has implications for the way the exchange organizes its service offerings – this will be discussed in the next chapter. This chapter focuses on how, in the context of Bhutan, a commodity exchange can contribute to the development of sustainable, inclusive agriculture. It is hoped that this can serve as an introduction to the mechanics of commodity exchange operations in an emerging market environment for those who have had little or no exposure to this topic. The discussion follows the value chain, from when a farmer decides what to grow to the arrival of his produce with the final consumer.

- ***Pre-production: an exchange may help farmers decide what to grow***

The market transparency provided by an exchange can help farmers decide what to grow. In India, when both soybean and wheat futures contracts operated, the price signals from these contracts encouraged farmers to shift from one to the other in unprecedented numbers. But this is for annual crops. In Bhutan, this aspect of an exchange will be of much smaller significance. Cardamom, apples and oranges are all tree crops, and shifting from one to the other on the basis of just a year's price signals may not be advisable. At best, farmers may decide to spend more money on the proper maintenance of their trees and on the harvest when prices are favourable. Furthermore, there is no ready alternative to potatoes as a cash crop. So farmers would not shift into another crop because of price signals; but they are likely to grow more potatoes if they are confident of their ability to market their produce.

More generally, if the government decides to use the exchange to operate minimum price support schemes (this is further discussed in the next chapter), the possibility to deliver at a nearby warehouse at a guaranteed price would encourage farmers to grow crops which (s)he previously found too risky.

Nevertheless, at some time in the future the exchange can play a role in helping farmers decide what to grow, in particular when it introduces contracts for niche commodities for which it has found interested (international) buyers. As international experience shows, the availability of a ready market with published, attractive prices can entice farmers to invest in new cultures, particularly if supported with appropriate advice and seed materials.

- ***Supporting finance to farmers during the growing season***

The role of an exchange in supporting the provision of finance to farmers during the growing season will be indirect, dependent on the interest of third parties to use the exchange as a vehicle for their products and services, and at best can become of significance only after the exchange has operated for three years or so. Nevertheless, early on, the exchange should start working with interested banks on introducing proper bank pre-harvest finance for farmers.

the social stigma that adheres to defaulting on sales to schools... (SNV, "Guidelines for facilitation of contractual supply of RNR products by farmers' groups to institutes", February 2014) Contract farming was an important new initiative in the Tenth Five Year Plan, which recommended ten commodities for contract farming: apples, oranges, seed potatoes, asparagus, mushroom, pomegranate, walnut, passion fruits, persimmon and pears. (DAMC/MoAF, "Contract farming in Bhutan", not dated)

In the proposed exchange model, the exchange will create a repository of information on farmers who sell to the market. Each farmer using the exchange will be registered with information on his operations (acreage, crops, expected crop sales). This information will, after some time, be sufficient to build track records of individual farmers. This, in turn, can be used by many companies to target farmers: for example, input providers that want to market their fertilizer and other products; banks that want to identify the farmers with the least risk of defaulting on their loan; even purveyors of innovative ideas or products who want to identify the farmers who are most likely to try out something new.

To reduce the risks of lending to farmers, the exchange can offer a collection service to financiers. Loans would be registered with the exchange. Then, when the farmer delivers his produce to the exchange for sale, the exchange deducts the reimbursements due by the farmer to the bank from the proceeds of the sales, and pays the remainder to the farmer.

- ***Improving the farmer's position at harvest time***

The improvement of the position of the farmer at the time of harvest is one of the major expected effects of introducing the proposed BCE; experience in India suggests that the prices realized by farmers can improve by 4-5%. It will happen for several reasons:

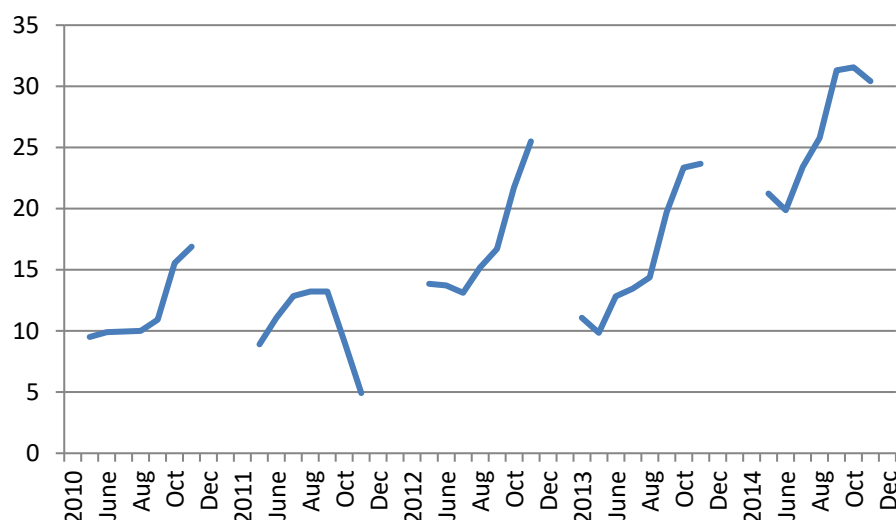
- Currently, only the farmers who can afford to go to the auction yard to sell their potatoes (or other crops) can experience competitive bidding for their produce. In the BCE model, all farmers of exchange-traded commodities who can bring their produce in sufficient quantity to the nearest exchange-approved warehouse will be able to sell their commodities to the highest bidder.
- Furthermore, these farmers can leave their products in the warehouse for a longer period, whereas if they bring it to the auction, they are under pressure to sell whatever the price - the alternative of refusing a bid and taking the produce back home is not practical.
- Even farmers who cannot take part in the exchange (for example because their marketable surplus is too low) will benefit because of the strengthening of local markets (which will all be linked to a national market place, instead of being isolated, as now often is the case). They will also have access to price information which helps them to bargain better with buyers.
- The exchange will offer the possibility of financing produce while it is in an exchange-approved warehouse. Most farmers still have no access to credit.²⁴ Warehouse receipt finance through BCE empowers farmers (in particular poorer ones who tend to have the greatest need for cash) to decide to postpone their sale if they expect higher prices later on. Auction data indicate that in the case of potatoes, prices tend to increase in the course of the auctioning season, by as much as 50% compared to the beginning (in the past five years, the only exception was in 2011 – see Figure 2). Auction data also indicate that in most years, more than half of the auctioned potatoes are

²⁴ In a 2010 paper, it was noted that less than 20% of farmers (the total number of estimated farm households was 87,500) had access to credit, and for small farmers, it was only 10%. (Bishnu Prasad Pathak, "Review for improving microfinance services in Bhutan", Kyingkhor Consultancy Services, Thimphu, July 2010)

sold by the end of September, so most sellers miss the usual October-November price surge.²⁵

Figure 2

Potato auction prices on the FCBL Phuentsholing Auction Yard (Nu./kg)



Source: based on data provided by FCBL

As a simple exercise to illustrate the benefits of selling later, Table 2 compares the actual average price received in the Phuentsholing auction each year with the price that farmers would have received had each sale been held a month later (the assumption is that Bhutan is a price taker). In most years, even this one-month delay would have led to considerably better prices, with the difference far exceeding the costs of storing the potatoes for a month.

Table 2

Realized potato prices versus prices for 1-month deferred sales, Phuentsholing

	2010	2011	2012	2013	2014
Actual average price (Nu/kg)	11.3	10.8	15.6	16.8	27.1
Average price if sales had been 1 month delayed (Nu/kg)	13.1	9.3	18.3	19.4	29.1
Difference (%)	16.1%	-14.7%	17.2%	15.6%	7.2%
Source: calculated from FCBL auction prices. For the deferred sales, the sales that took place in June were deemed to be at the average July prices; the July sales, at the August prices, etc. Only the December sales were kept in that month (as there is no auction in January). The difference expresses the gross gain of deferred sales; the costs of storage and finance for one month should be deducted to arrive at net gains.					

- More buyers will be attracted to the exchange, as its platforms permits a much easier collection of produce (for example, to accumulate several lots in

²⁵ As Bhutan is a price taker and prices are determined by conditions in the much larger Indian markets, a different delivery schedule should not influence this seasonality of prices. The harvest of potatoes in West Bengal, the main market for Bhutanese potatoes, is from January to March.

order to have one of sufficient size to transport), and also offers lower risks than traditional mechanisms (for example, the current system for cardamom, oranges and apples exposes buyers to the risk of default by those to whom they provided advances). This will lead to greater competition among buyers. Some of the larger buyers in India or Nepal (who now buy from the smaller traders in the border towns) may be interested in buying directly on the exchange, for example. The same holds true for organized local buyers (hotels, restaurants, boarding schools, hospitals, supermarkets, etc). Not only the aggregation of produce would attract buyers, but also the quality controls imposed by the exchange. Traditional storage by farmers may leave much to be desired. In the potato value chain study, for example, “storage conditions were found to be very poor; many of them were damp, with poor air circulation, while some were exposed to the sun”, and during storage, the potato tuber moth did much damage.²⁶ Modern, exchange-approved warehouses would ensure the availability of high-quality produce throughout the season.

- ***Reducing transaction costs from farm to fork***

BCE will provide a centralized marketing mechanism that reduces a broad range of transaction costs: market information will become easier to obtain²⁷; buyers can find sellers more easily, and vice versa; the inspection and certification of product quality will become a standardized service; transport arrangements will become more efficient; and payment and financing arrangements will improve. Transaction costs in Bhutan are currently significant. For example, transporting potatoes from a particular geog, Nangar (in Bumthang, a major potato producing district), to the auction costs “between Nu 9,600 and 12,800”, and farmers additionally have to spend over Nu 5,000 for accommodation and food while they are waiting for their potatoes to be sold.²⁸ An average household earns from 25,000 to 110,000 from the sale of potatoes, so percentage-wise, these costs are much higher than the fee charged by the auction itself.

The exchange is conceptualized as an interlinked network of delivery locations, with farmers mostly delivering their produce to upcountry warehouses. Transporting produce from these warehouses to the delivery locations – the auction towns at the border as well as Bhutan’s big cities – would be the responsibility of FCBL (other transport companies could be added later on). FCBL has its own small transport fleet, and has agreements with private transporters to provide it with transport services at fixed rates. FCBL can use the transport of exchange-traded commodities to optimize the use of its transport fleet, thus reducing the (currently quite high) frequency that its trucks have to drive empty to the border towns.

Transport costs will also be reduced because of improved transport arrangements, in particular in the case of potatoes. Currently, potato farmers bring their produce to the nearest road, and then flag a passing truck to transport their bags of potatoes to the auction yard. Prices are fixed per bag, and “potato growers tend to be clever in taking advantage of this situation and try to put 60-75 kg potatoes in a perforated nylon bag

²⁶ Joshi and Gurung, *op. cit.*, 2009.

²⁷ Currently, DAMC is tasked with strengthening the existing market information system, to ensure real time market information is made available to rural farmers. The exchange can provide such information for the commodities that it trades. It will also help make such information available to farmers, eg through mobile phones.

²⁸ “Farmers look forward to trade with FCBL”, Editorial, Kuensel, 16 July 2014.

of 50 kg capacity. But in the end they get a lower price for their potatoes as overloading causes damage to the tubers.”²⁹

Again in the case of potatoes, a further reduction in transaction costs comes from the fact that farmers will be able to avoid the long waiting time that may occur at the auction yards. During the height of the marketing season, farmers may have to wait a week or even longer before there is room at the auction yard for the sale of their bags; their costs of lodging and food quickly start adding up. Meanwhile, the potatoes are generally kept in the truck (a line of trucks await their turn to enter into the auction yard), at a cost to the farmer and also exposing his produce to heat and humidity (which can make them lose a significant part of their potatoes). The proposed exchange operations will make this experience obsolete. Potatoes can be stored in upcountry warehouses until there is a buyer, and then FCBL arranges transport to the place indicated by the buyer.

- ***Improving the perspectives for processing projects***

Investors are often wary of agricultural processing projects because the supply of raw materials is not guaranteed. If there is an exchange, the processor can use it as a procurement mechanism, to procure the needed quantities at the right quality. Moreover, existing processing facilities such as Bhutan Agro Industries Ltd, potato chips producing Happy Green Cooperatives and others will benefit from an easier accessible supply of raw materials.

Capturing the consumer's interest by putting a quality stamp on Bhutanese product

BCE, if successful, will become known as a reliable source of Bhutanese produce. The exchange should strive to guarantee to all its users a perfect contract performance. There should be no defaults for the trades executed on the exchange. For all transactions, the exchange, in a way, should put its own name against that of the original buyer or seller. Rather than being exposed to the risk that the original buyer or seller (or the warehouse issuing a receipt) defaults, those active on the exchange will be exposed to the risk that the exchange defaults. BCE should build on this image as a reliable supplier to brand itself as a supplier of reliably high-quality produce, from a country that already has a good reputation with consumers.

Thus, the exchange offers the opportunity to leverage Bhutan's comparative advantage in temperate and sub-tropical commodities. The starting point is the establishment of the exchange as a reputable source of supply within South-Asia, with impeccable quality controls over the produce that is to be sold through its platform.³⁰ Consumer markets in Bangladesh and India are changing, and in particular supermarkets are continuously looking for this kind of product. If the exchange can create the right brand and reputation, it will enable the sale of Bhutanese produce directly to such buyers, bypassing middlemen and linking farmers to a growing, relatively well-paying market.

²⁹ Joshi and Gurung, *op. cit.*, 2009.

³⁰ Note that this does not imply that only high-quality produce is sold, but rather, that all produce has an accurately identified quality – lower-quality produce will then simply go for a lower price.

Chapter 3

TAILORING A COMMODITY EXCHANGE TO BHUTAN'S CONDITIONS

For BCE to operate there is a need to define the overall systems architecture, the components necessary to make it work, its exact operations, and the roles and responsibilities of key stakeholders. The chapter sets out the overall systems architecture, and describes in some detail the operations, roles and responsibilities for that would be required for the exchange to work.

A. Proposed system architecture for the BCE

In the Bhutanese context, a commodity exchange should first and foremost act as a mechanism to facilitate physical trading, and secondarily, as a mechanism to improve access to finance for the commodity value chain.

The jump from a localised auction to a national exchange necessarily passes through the trade of warehouse receipts. Warehouse receipts are very useful to a variety of actors. Farmers can store their product after harvest, instead of selling it immediately, and use the warehouse receipt to obtain a credit. Processors can use working stocks as collateral, ensuring that the need to store physical commodities is no longer a financial burden for them. The reduced costs of storage and the low costs against which farmers and others can borrow against goods in store will reduce seasonal price differentials, to the advantage of consumers. If these receipts are also traded on an exchange, there are many additional advantages. For example:

- If warehouse receipts indicate a specific grade of the commodities stored, the exchange will be able to collect and distribute information on the prices at which each grade and delivery center is traded. This greater transparency leads to a whole range of new possibilities for farmers, traders and processors. For example, they could give "open" orders to intermediaries active on the exchange, to buy or sell when a certain price for a certain commodity (stored at a certain warehouse) is reached.
- The greater transparency of price differentials and locations will improve spatial and quality relations. Those who need commodities will be able to make choices that are more rational on the grade of commodities they need and on the place where they want to take delivery. Similarly, if differentials exceed certain thresholds, traders and others will undertake arbitrage transactions, for instance by moving commodities from one warehouse to another.
- In principle, traders can start engaging in short sales (that is, physical contracts to sell commodities that they do not yet own), because they know there is a market which provides access to a ready supply of warehouse receipts. So if they see a good market opportunity, they can enter into a sales contract, and then buy the commodities that they need to meet their delivery obligations. In countries like India, this has permitted exporters of spices such as black pepper and cardamom to gain global market shares by making long-term forward sales. However, it should be noted that short sales have inherent risks (supply conditions can unexpectedly change), can be used for speculative purposes and if misused, can lead to defaults on delivery obligations and large losses. The exchange may want to limit short sales on its platform (for example, not permitting short positions to exist for more than two days), until such time that the market is sufficiently developed, with market participants having gained a good understanding of advanced marketing mechanisms and the exchange able to levy variable trading margins.

- Non-traditional players can become active in the commodity value chain, in particular those with access to ready funds who are looking for secure short-term investment vehicles. They can buy warehouse receipts, which are much easier to buy, hold and sell than truckloads of commodities. This involvement improves market liquidity (it becomes easier to buy and sell), and thus reduces transaction costs. In addition, it brings a new non-banking source of funding into the agricultural sector, which reduces financing costs. However, it should be stressed that with such a new source of liquidity in the market, it may be tempting for some to start engaging in fraudulent activities, creating fake stocks (eg, by bribing warehouse staff to issue warehouse receipts that do not conform to actual deliveries) in order to attract funds. A high degree of vigilance, backed by appropriate warehouse supervision systems and warehouse management software, is required to keep such risk under control.

At the core of the exchange are two software modules, one dealing with the warehouse receipts (the warehouse receipt system, which doubles as the exchange delivery system), the other with exchange trading (the trading engine). Additionally, the commodity exchange needs to install a number of modules which need to interface (with a “sending” and “receiving” component) with the two core systems. These modules are:

- The brokerage system. Brokers are the intermediaries between the exchange and most of its users. Generally, a trading engine is supplied with a default brokerage system, which gives the minimum functionalities for a broker to operate properly. The exchange will also provide gateways for brokers and other members to connect using their own systems (internationally, there is a standard protocol for this, the Financial Information Exchange (FIX) gateway).
- The clearing and settlement system, the main risk management system of the exchange.
- The regulatory system (both government regulation and the various components of self-regulation). This ensures the generation of reports required by the regulator, permits the exchange to detect trading anomalies (eg, manipulation attempts, or suspicious behavior by brokers that is possibly linked to them defrauding their clients).
- The payment system: a link with the banking system, permitting easy payments into and out of the exchange.
- The price information system, to send out price information through a variety of means (internet, mobile phones, ticker tapes, price feeds for television stations, etc.).

The following sections describe some of the aspects of this systems architecture in the specific conditions of Bhutan.

B. Managing physical flows under the new electronic system

The new system would aggregate production in storage/ warehouse facilities in main production areas and link these facilities to an electronic trading system (commodity exchange) that effectively would enable buyers bid for produce that may be stored in distant locations. These storage facilities (godowns, depots, warehouses, ZECs, refrigerated cold storages) will be called *Collection Centers (CC)*. Some Collection Centers may be for all commodities offered on the exchange, others only for certain commodities. The operational sequence for handling commodities from farm gate to buyer is suggested below:

- a) **The exchange approves Collection Centers.** These need to be:
 - in a location with reasonably reliable road connectivity;

- in physically sound condition;
- in possession of a weighing scale;
- outfitted with basic quality grading equipment (this can be outsourced to BAFRA³¹, but in any case, it has to be possible to identify both quantity and quality of the produce that is brought for storage);
- operated by a reliable and trusted warehouse operator (eg, FCBL) which carries sufficient insurance to major risks (such as fire or flood damage); and
- connected to the Internet, with reliable connection once a day.

In addition, these Centers need to be manned by staff that has been trained in the procedures necessary for establishing an exchange-tradable warehouse receipt; with at least one staff who has passed the exchange-set commodity brokerage operation.

The exchange will determine for which commodities the Collection Center is suitable. The designated CCs shall accept arriving commodities with clearly defined procedures and responsibilities.

- b) Delivery to the warehouse near the production areas.** Farmers deliver their goods to an approved nearby Collection Center. The commodities delivered to an approved warehouse (i) need to be assessed and verified concerning quality, quantity and ownership and subsequently, (ii) they need to be registered online with the warehouse receipt system, creating an electronic asset that can be traded, pledged, and used as a delivery instrument on the exchange trading engine.

Upon arrival the good are graded, packaged, rejects discarded. BCE shall have standardized bagging requirements as specified in the contracts; e.g. potatoes are required to be packed in 50 kg jute sacks. All depositors shall be expected to bring their commodities packaged and pre-sorted according to the uniform BCE/ BAFRA grading scheme.

The exterior quality and quantity of commodities must be examined following certain processes and procedures, verifying the suggested quality standard, removing any unmarketable material, and determining the final quality grade according to the requirements by BCE/ BAFRA. If BAFRA staff or another mandated independent grading certification agent is not available at a Collection Centers, then this center cannot issue any warehouse receipts into BCE's warehouse receipt system. However, it is not required for BAFRA to be permanently present at the CCs; instead visits from BAFRA field officer staff can be arranged according to demand. Goods would have to be aggregated and transported to a warehouse where quality certification is possible before a receipt can be issued. Inspection and monitoring could be carried out by BAFRA officers located in the 30 regional offices across the country. Following sampling and grading the depositor in unanimity with the CC manager will confirm and acknowledge the assigned grades by signing the grade sheet. Items to be checked by CCs are: names of commodities, specifications, quantity, required documents for entry, package and apparent situation of the commodities.

³¹ BAFRA operates 30 field offices with officers in every Dzongkhag and at every border entry point. BAFRA has 65 quality standard in place, among them for apples and oranges. Quality certificates for the latter are issued for exports to Bangladesh and Nepal in cooperation with the Bhutan Exporters Association (BEA). To settle disputes on product quality and certification, BAFRA operates a 24h hotline.

Following the above procedures, the deposited commodities are bar-coded and subsequently digitally registered with the warehouse receipt system (quantity, quality, location, delivery point). The farmer is handed a certificate of deposit with a copy (e-form) held by the warehouse. The farmer could use this certificate (as a pledge) to obtain credit from a bank or just to hold it as proof of ownership of the commodity. The farmer incurs storage costs (at a rate publicly displayed at the warehouse) if the goods remain in his ownership in the warehouse for more than a day. For certain commodities, depending on their perishability and location, the farmer may agree that, as he wishes to store the produce for a longer period, it may be transported to a cold storage facility to prevent quality losses.

- c) **Offering produce at the electronic system.** While at the warehouse, the farmer has access to exchange information on previous prices and volumes traded. Market information is shared with the farmer and a sales strategy is discussed with CC manager. If the farmer wishes to sell his produce through the exchange, he has to sign a brokerage agreement with the CC manager (acting as seller's broker).³² On the basis of his assessment of the market, the farmer may decide to ask the warehouse manager (acting as a broker) to enter part or all of his warehouse receipt into the system for immediate sale, or for sale at a target price. As will be discussed further in the next section, he will be able to choose between sale through the electronic warehouse receipt system, or through the electronic trading system. The latter is likely to give better prices, but is more demanding when it comes to quality and quantity put up for sale.
- d) **The electronic sale.** On the sell side, information on the quality and quantity for sale is entered into the system. The sales price, in the case of sale through the electronic warehouse receipt system, is the price indicated by the seller, for sale ex-warehouse. In the case of a sale through the exchange, it is the price indicated by the seller plus the fixed transport cost to the relevant reference delivery point advertised by FCBL (so that from the buyers' perspective, there is one market, of commodities deliverable at that delivery point, such as Phuentsholing).³³ FCBL will be quoting fixed rates for each season between each upcountry exchange delivery point and each delivery location (border towns, large cities), so that buyers will know the price on delivery to the delivery point closest to them.

In parallel, buyers put their bids in the system. If a buyer's bid meet the price set by the farmer (on a first-come, first-served basis), the good enter the status of "pending sale". The buyer is required to put up a security deposit (say 10-15% of the value of the goods) to ensure that he/she does not walk away from this transaction (this deposit will have been paid to the exchange prior to the buyer being given the possibility to buy on the exchange platform). At the same time, the warehouse manager "blocks" the goods at the warehouse and the farmer cannot remove them.

³² For reasons further discussed below, it is not advisable to let farmers trade directly on the exchange unless if they can meet the BCE's criteria in terms of creditworthiness and understanding of exchange operations.

³³ It is also possible to have more than one potato futures contract (one for delivery in the West, one delivery in the East), in which case upcountry warehouses are matched with the relevant border delivery points.

- e) **Delivery of produce from the warehouse to border warehouses/delivery points.** Following the acceptance of the bid and indication by the buyer that he wants to take immediate delivery, and receipt of his full payment of the goods, within a certain reasonable time frame the goods are transported to a delivery point. Delivery is under the auspices of BCE's delivery conditions, which in turn reflect annual agreements on transport conditions, including time and cost, with FCBL as BCE's transport agent, and/or with third party transporters. Conditions can stipulate, say, that delivery has to be within three days - to make it possible to fill up trucks, to reduce per kg transport costs. Standard delivery points and modalities are determined by the exchange for each commodity. Delivery points can include large cities and border towns. For exports, they will be the border towns where FCBL now has its main auction yards, namely Phuentsholing, Gelephu, and Samdrup Jongkhar. However, to reduce transaction costs and make use of the exchange more attractive to buyers, buyers will be given the option of having the goods delivered to their premises, rather than to the FCBL auction yard from which they would then have to pick them up. Also, the option should be provided for delivery elsewhere, even within India, if mutually agreed between the buyer and FCBL as the transport company. The buyer can check that the quality and quantity as described in the electronic system are accurate. The exchange will have a mechanism to arbitrate differences, for example by a specialized agency such as BAFRA.

Once clearing, settlement, and delivery are completed, the exchange transfers the total amount received from the buyer, minus its own trading fees and other agreed deductions to seller's broker account, eg the CC manager. The broker, in turn, transfers the money either directly to (i) farmer's account or (ii) to a BDBL-operated Community Center for cash payment or (iii) he cashes out to the farmer directly. All those who directly use the exchange have to have bank accounts; it is also preferable for indirect users (eg, farmers) to have bank accounts, so that it is easier to control against the risk of broker fraud.

- f) **Fee payments.** BCE would charge commissions for its services which will be added to the price paid by the buyer and deducted from the price to be paid to the seller. This includes all services received at the warehouse (grading, storing, bagging, etc). The seller also has to pay brokerage fees to the broker (normally, the warehouse manager); if they both agree this can be through deduction from the price paid by BCE to the seller. Assuming he takes delivery and does not re-sell the warehouse receipt, the buyer has to pay transportation fees, which will be payable directly by the buyer to FCBL (or to another BCE-approved transport agent). In the case of a sale through the warehouse receipt system, the price at which a deal is struck is ex-warehouse, so this is rather straightforward. In the case of a sale through the exchange, a deal is struck at the price of "Phuentsholing delivery" (or other relevant reference delivery point), which consists of the seller's ex-warehouse sales price plus the advertised FCBL transport costs. Once the deal is done, the exchange will collect the portion due to the seller (plus exchange fees), and then transfer the warehouse receipt to the buyer. The buyer has to arrange with FCBL when he wishes delivery to take place and where; any divergence from the BCE-set conditions is to the account of the buyer. This can lead to a higher price for the buyer, but also to a lower one (for example if he elects for delivery in, say, Thimphu).

Currently the auction system run by FCBL has charge similar commissions to buyers and seller at the auction yards, and the overall fee structure of BCE would be more attractive than that of the auction yard system.

The following fees can be suggested. All fees are proportional - a percentage of the “daily” value of the goods as published the previous evening on the exchange, or in the case of a sale/purchase, of the actual sale/purchase price; or a percentage of the loan given to a farmer.

Agent fees	Commission as % of reference price
Fees to BCE on establishment of the warehouse receipt (grading, storing, bagging, etc) – payable by the farmer (Note: 0.5% of the fee is passed on to the warehouse manager; this is to cover all costs related to the goods moving into and then again out of the warehouse)	1.5%
Brokerage fees for offering goods for sale on the electronic system, and then handling the position (including information to farmer) – payable by the seller	0.5%
Loan arrangement commission, as % of the loan – payable to BCE by the bank providing the loan (part of this commission can be shared with the broker)	0.17% of the nominal loan value per full month
Trading and clearing fees on the successful conclusion of a sale of a warehouse receipt/commodity exchange contract – payable by the seller	0.25%
Trading and clearing fees on the successful conclusion of a purchase – payable by the buyer	0.25%
Fees to BCE for taking physical delivery against a warehouse receipt – payable by the buyer	1.5%
Storage fees, payable by the owner of the warehouse receipt	<i>as per warehouse-operator quoted daily rate</i>
Transport costs for delivery at their indicated delivery location – payable by the buyer	<i>as per FCBL-quoted rate</i>
<i>Note: fees are indicated as a % of the value of the goods to enable comparison with the current auction system. They can be replaced by fixed fees.</i>	

This price schedule results in total fees collected by the exchange, from delivery by the farmer to receipt by the ultimate buyer, of 3.5%.³⁴ In addition, in case that the farmer wishes to sell his goods through BCE, he pays a 0.5% brokerage fee to the broker, such as the FCBL warehouse manager. Farmers who just want to use the system for financing their stocks pay only a 1.5% fee. These percentage fees could be replaced by fixed fees, of course. If they are set as a percentage, one needs to determine which reference price is to be used. For example, for potatoes, it could be the previous working day's average price for delivery in Phuentsholing. Storage costs plus transport costs from the up-country location to the buyer's location are additional.

Of these 3.5%, half is payable by the buyer, and half by the farmer. 3% are for BCE, 0.5% for the warehouse manager. The total fees for farmer and buyer are attractive compared to the fees currently charged by the auction (from 0% for

³⁴ While this is on the high side compared to many delivery-oriented electronic exchanges (where fees are 1-2%), this still compares favourably with, for example, the total fee of 4.3% on the Dutch flower auction, or the up-to-7% fees of Bhutan's existing physical auctioning mechanism. Over time, the exchange can reduce its commissions when volumes increase.

early delivery to 4% during the main delivery months as farmers' fees, and 3% as buyers' fees).

Having a separate, low fee for successfully selling or buying a warehouse receipt will encourage liquidity on the exchange: even those who do not need physical delivery can buy warehouse receipts if they deem that prices are attractive, for re-sale later on. And until there is a buyer who wishes to take delivery, goods can be left in the exchange warehouse (paying storage fees, of course), financed through warehouse receipt finance.

If the farmer in addition benefits of finance during the time he owns the warehouse receipt, then for each full month that the loan is outstanding, the bank providing the loan pays a commission to BCE – the rate proposed here is 0.17% per full month, which covers all the fees of managing the collateral on behalf of the bank.³⁵

C. The differences between the electronic warehouse receipt system and the exchange trading engine

In reflection of international practices, BCE will have two complementary systems: a warehouse receipt system, and an exchange trading system. As the warehouse receipt system provides trading functionalities, and the physical delivery on the exchange will rely on warehouse receipts, one might ask why two different systems are needed. In summary, the differences between the two can be described as follows.

Table
Key differences between an electronic warehouse receipt system and commodity exchange trading

Electronic warehouse receipt system	Commodity exchange trading
Many commodities possible	Only a small range of commodities, and also other contracts
Any grade at any quantity above a certain (low) minimum. No fixed lot size.	Only specific grades at set quantities (specific lot sizes)
Many warehouses	Key warehouses
For trade and finance	For trade only
Only for commodities that have already been deposited in a warehouse that is part of the system	Both long and short sales (ie, covered by physical goods, and not yet covered by physical goods)
Forward contracts possible	Futures contracts possible
Government involvement possible	Government involvement strongly discouraged
Retail investors unlikely	Retail investors encouraged
Trade is possible 24 hours a day	To concentrate supply and demand, trade is only possible during pre-set trading hours

³⁵ If the farmer defaults and the bank has to take delivery, then it should pay the usual buyer's delivery fee of 1.5%.

The two systems have different strengths and weaknesses, and by combining them the best conditions can be created for sellers and buyers alike. One can consider the inherently conflicting interests in different aspects of commodity marketing:

- Farmers would like to be able to deliver whatever they produce to the exchange at the best possible price. Buyers want to be able to rapidly buy what they need at the best possible price. The two do not go well together. For buyers, transaction costs are unnecessarily high if they have to sort through a wide range of qualities on offer, in quantities that vary from a bag to a few tonnes, in warehouses all over the country. Furthermore, markets profit from the presence of traders (including retail investors) who buy or sell when they perceive the market to be favourable, not in order to make or take delivery against the contract but in order to close out their position through an opposite transaction later on – this is only possible if supply and demand is focused on a limited number of standardized contracts, otherwise these traders could get stuck with physical commodities for which they cannot find a ready buyer.

Having two different systems resolves this conflict. The exchange trading system provides only selective access, but for farmers who cannot meet these requirements or who have high-quality products on offer³⁶ the warehouse receipt system also offers trading functionality, although participation will be more limited than that of the exchange. There will be arbitrage between the two systems, of course: some traders or large farmers will buy smaller lots to consolidate them into exchange-size lots; and will buy poorly sorted produce to sort it and return it to the warehouse as a better, exchange-compatible quality.

- On an exchange, one wants to have short-selling, that is to say, the sale of produce for future delivery by traders who do not have the commodity yet. This helps ensure that sellers who come to the exchange have a ready buyer, and buyers have a ready seller (for the same reason, an exchange restricts trading to certain times). These short sellers either expect to be able to procure the commodities later at a profitable price, or to buy an offsetting quantity later on when prices have fallen.

Whereas long sales are guaranteed by physical goods (the main risk for the exchange is that there was fraud and these goods do not exist, or that the goods get damaged), short sales expose the exchange to considerably more risk. Short sellers pay guarantees to secure their sales (just like buyers pay guarantees in order to secure the full execution of their order, in both the warehouse receipt system and the exchange trading system). Nevertheless, for better control of these risks, the exchange may have to physically inspect in the area where the short seller indicates he will make delivery whether indeed, the seller disposes of the necessary stocks. Thus, it is preferable for the exchange not to deal with too many different delivery locations.

- On a commodity exchange, prices have to reflect supply-demand conditions. It is risky for all parties concerned to have a government agency that intervenes in these markets in order to stabilize prices – for one, information

³⁶ Eg, produce which has been certified as organic. In the warehouse receipt system, it is possible to attach scanned documents to a receipt. Producers can also selectively inform buyers, for example those they know to be interested in organic produce, of the availability of their product for sale to the highest bidder.

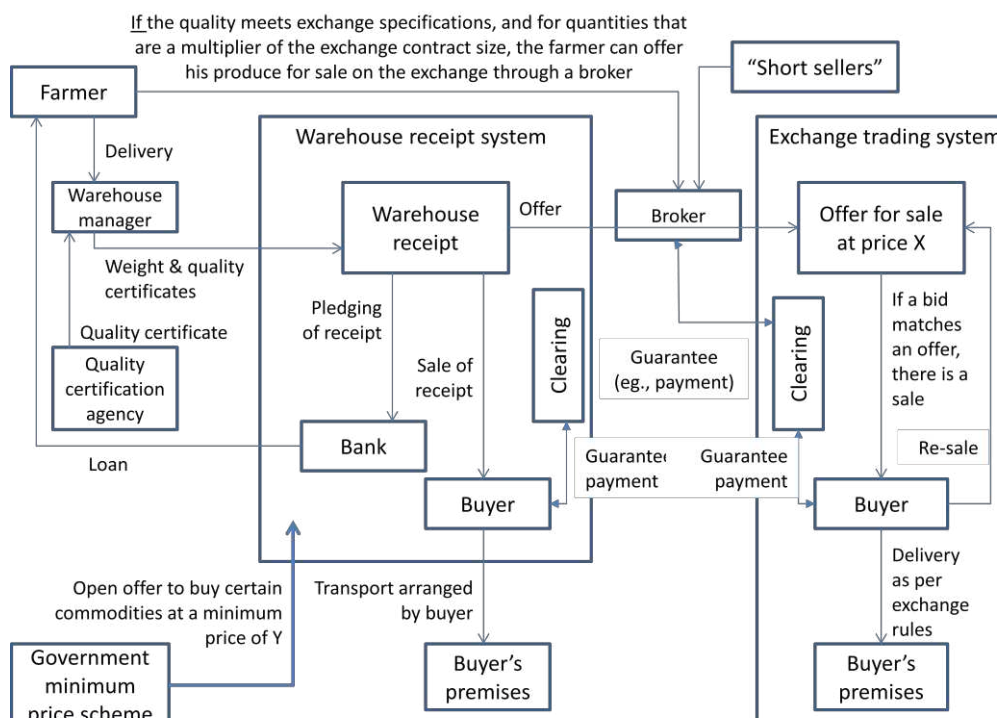
on when exactly this agency will start buying and at what price will be rather valuable for market participants. However, having such an agency active on the warehouse receipt trading system is much less disruptive. The agency can announce, at the beginning of the season, that it is willing to buy a certain amount of produce, represented by warehouse receipts, for a certain price. Those active on the market can then decide whether they wish to deliver against this government commitment. In the warehouse receipt system, this is a simple book transfer – ownership of the receipt changes from the farmer to the government agency, and the farmer receives his minimum price (after deduction of the reimbursement of an eventual bank loan).

- The exchange has to provide arbitration functions for exchange-traded commodities, eg if there are disputes on the quality supplied in comparison with the quality on the quality certificate. But it is in practice impossible to provide such services for all commodities. So some of the trade on the warehouse receipt system may be on a “buyer beware” basis. This is possible because the warehouse receipt system permits buyers to specify a list of sellers from whom they are willing to accept offers.
- For bank loans, it is preferable that a wide range of commodities, in any volume, is accepted as collateral. Thus, banks will normally operate on the warehouse receipt system, not on the exchange.

Figure 2 describes the differences in operation as well as the interaction between the two systems in a graphical manner. The figure can most easily be read from left to right, starting with farmers depositing goods which are accepted under the criteria of the warehouse receipt system; which can then be sold through that system or if they meet additional criteria and the farmer so desires, through the exchange.

Figure 2

Key operational differences between an electronic warehouse receipt system and commodity exchange trading



Note that in the Bhutanese context, it is preferable for the exchange to guarantee delivery up to the buyer's doorstep (as long as this is in a border town or a main city). This assumes fairly standardized conditions, which can be created if the number of delivery options is limited. But for delivery in the warehouse receipt system, the number of delivery options is unlimited, and BCE cannot reasonably provide standard delivery conditions. So if, for example, a buyer buys one bag of potatoes in the warehouse receipt system, it is his problem to arrange transport. But if he buys one contract on the exchange, with an exchange-set delivery size of 4 tons ($\pm 10\%$), then under its agreement with BCE, FCBL guarantees delivery at pre-set rates per kg within a set timeframe.

D. FCBL's stock management system versus an electronic warehouse receipt system

Currently FCBL is in the process of implementing an in-house centralized web-based Enterprise Resource Planning (ERP) solution. Two integral application modules of the system are (i) a warehouse stock accounting & supply chain management information system and (ii) an agricultural marketing management information system (auction system). However, as of now, the design of the ERP system does not take the requirements of the commodity exchange project into account.

The warehouse stock accounting system will help FCBL in properly managing its warehouses and its stocks. It will enable it to issue warehouse receipts confident that it will be able to retrieve the goods without difficulty, and more broadly, it should make FCBL confident that it can commit to provide high-quality services to the exchange (for example, that it can handle the logistics of transporting produce to the delivery locations indicated by the buyer).

But a warehouse stock accounting system does not provide functionalities for trading, or for the management by a bank of the stocks that have been pledged to it. Nor will the proposed upgraded auction yard system. In fact, given the plans for exchange trading, FCBL may review to what extent this planned module is still relevant as volumes are expected to shift from the traditional auction yard to the exchange.

In principle, a proper warehouse receipt system, with trading and pledging functionalities, could be added as a third module to the FCBL system. However, while perhaps such a module could be developed by the same Bhutanese company which has been developing the FCBL system, creating it as a subsidiary system of FCBL is not advisable for two reasons:

- FCBL will not be the only entity acting as warehouse manager for the exchange. In the short run, NPHC would be another candidate, and in the longer run, the exchange would incorporate any warehousing company or collateral manager that meet its criteria (thus giving an incentive to the private sector to invest in such warehouses). Each of these organizations can have its own warehouse management system that permits it to issue receipts; but there should be a common independent system to then handle these receipts.
- Under the proposed exchange system, warehouse receipts become a financial instrument. This implies certain new risks that can best be handled by a company (such as the commodity exchange) in which handling such risk plays a central role. This also permits proper checks and balances between on the one hand the creation of the warehouse receipts, and on the other, their use for trading and financial purposes.

E. Managing risk in the new electronic system

Risks for buyers and sellers

The new system aggregates production in modern storage/warehouse facilities in main production areas and links these facilities electronically to a system that effectively enables buyers to bid for produce that is stored in distant locations. This implies risks for both buyers and sellers.

Buyers who previously were able to inspect the goods they were going to buy are now expected to buy sight unseen. They will only be willing to do so if they can trust that the description of the goods, as per the quality certificates, is correct; and if the goods that they buy are reliably delivered to them. So:

- There is a need to accurately grade and specify the quality of good stored in the distant storage facilities/warehouses operated by a credible and qualified warehouse manager). If the buyer considers that there is a discrepancy between the quality indicated in the warehouse receipt and that delivered, he needs to have access to a rapid and reliable arbitration mechanism. If there was indeed a discrepancy, the buyer must be made good for the losses he suffered as a result.
- There needs to be an entity that would reliably transport the produce from the distant warehouses to the specific delivery points where the buyer takes possession of the goods. Given FCBL's availability of transportation (trucks) it could offer such a service for a fee. However, FCBL has to commit to clear performance standards, and declare itself liable to pay for any damages that may result from it not meeting these standards.

For sellers, the main risk is that buyers on the exchange collude to drive prices down. This risk is larger on an auction than on an exchange, but it nevertheless exists. The exchange has to try to reduce this risk by bringing a diversified group of buyers to its platform; and by the monitoring of trade combined with fines for buyers who break exchange rules on market manipulation.

With the exception of large buyers and other market participants who have the capacity to become a member of the exchange and execute their transactions themselves, buyers and sellers will make use of a broker. They will then be exposed to the risk of incompetence or dishonesty on the part of the broker. To manage this risk, the exchange needs to license brokers, and also to have an arbitration system, backed by financial guarantees, to decide on conflicts between brokers and their clients.

Risks for the exchange

One of the critical value propositions of an organized exchange is that when a buyer and a seller agree to a transaction, the exchange through its clearing department or its associated independent clearing organisation immediately interposes itself between the two, and becomes the counterparty to both sides of the contract (this is called "novation"). So the exchange/clearing house will guarantee performance under the contract to both the buyer and the seller, separately. If, say, the seller in any way defaults on his obligations, the exchange/clearing house adequately compensates the buyer for the resultant loss; the exchange will later on try to recover the pay-out

from the defaulting party. Thanks to novation, buyers and sellers do not need to perform any due diligence on each other before entering into a deal.

However, the exchange needs a system to keep these risks manageable. The main element of this system is margining: when they enter into a transaction, both buyer and seller deposit a margin as guarantee of their performance on their obligations. In case the seller is selling warehouse receipts, then the exchange's control over these receipts will be enough. Otherwise, the margin has to be paid in cash or in cash-like securities (the exchange will define what financial instruments it considers liquid enough). For transactions that will be executed not too long after the buyer and seller entered into a deal (say within a week), the margin can be a fixed amount, sufficiently high to cover the possible³⁷ price within a week. For transactions with a delivery time further in the future, the exchange should dynamically margin the position: it regularly (eg, daily) reviews the risks, and asks buyers or sellers to pay additional margin if risks have increased.³⁸

F. The exchange as a tool for government agricultural subsidy policies

According to a document of the Ministry of Agriculture and Forests, "Owing to the insufficient priority accorded to the [Renewable Natural Resources] sector in the past decades as evidenced by diminishing public investment, the sector today is struggling, resulting in the importation of large quantities of food annually, causing negative trade balance."³⁹ In the document, FCBL is described as the lead agency for instituting an organized marketing and contract farming system. Among other things, it would "ensure farm gate price equivalent to cost of production, plus a premium to producer farmers."

For its main agricultural exports, Bhutan is a price taker, dependent on the prices in the nearby countries which are Bhutan's main offtakers. Thus, it is possible (and has happened frequently in recent years) that farmers make planting decisions based on the previous season's high prices, only to be confronted on harvest with a glut in their target market and much lower prices. This discourages farmers from commercial farming. Similarly, for crops that Bhutan imports, local prices can turn out to be much less than what farmers had envisaged when planting, because of price falls in the origin countries. The Government of Bhutan already operates a small subsidy scheme for farmers who are grouped in cooperatives and who enter into forward contracts with domestic buyers for vegetables – if import prices fall below the prices that the farmers had contracted, the Government makes up for the difference, to compensate the buyers for the relatively higher prices of the domestic purchases.

³⁷ This is defined as a confidence interval, say of 10%, with a certain confidence level, say of 98% - that is to say, given the relevant historic price data, the likelihood that prices will move within a week by more than 10% is only 2%. The exchange sets the confidence level on the basis of which margins are determined – in this case, if it has decided the confidence level is 98%, then both buyer and seller have to pay a 10% margin.

³⁸ For example, buyer and seller agree for the delivery of goods at a price of Nu 100 two weeks from now. Both pay a 10% margin. Three days later, prices have fallen to 89. The buyer will then have an incentive to walk away from the transaction and buy goods on the market instead (at a cost of 89, plus 10 lost as margin to the exchange). In order to prevent this from happening, the exchange/clearing house will ask the buyer to put up additional margin while prices are declining, so that at no time there is an incentive for the buyer to default.

³⁹ Kuenga Namgay, "Establishing Agricultural Market & Marketing Networks in Bhutan", Ministry of Agriculture and Forests, November 2011.

Without making any judgement on the desirability of such a policy (there may well be more effective uses of government funds), similar compensation schemes can be operated through the exchange. In particular:

- The government can act as a buyer of last resort for certain commodities, with warehouse receipts as the delivery instrument (this is similar to one of the schemes to support farmers that is operated by the US government⁴⁰). Before planting, the government would announce its purchasing price and the volume which it (through FCBL) is willing to buy, at a first come – first served basis. The purchasing season would be from the start of harvest to a few months later. Farmers would deposit their goods in the warehouse, and then offer them for sale through the exchange mechanism (eventually receiving a loan with the receipts as collateral). If his target price is not achieved and as long as the government's purchasing limits are not reached, a farmer can deliver his receipts to the government for the announced price. The problem with this mechanism is that the government has to re-sell the commodities that it has received, in a way that does not overly distort the market. This can be through sales to entities such as schools or hospitals, government-to-government exports, food aid in kind, or off-season sales.
- The government can apply subsidies through sales executed through the exchange. This is less advisable than the former modality, as the risk of fraud is much higher (no physical goods actually pass through the hands of a government agent). Moreover, it would have trade distorting effects.

The decision on whether to provide a minimum price floor or certain subsidies to specific commodities is a decision taken outside of the commodity exchange framework, and factors other than economic ones may influence such a decision. But whatever is the motive, market interventions of this nature have to be carefully calibrated to minimize market distortions and avoid crowding out of the private sector. For example, if a government agency holds large stocks, acquired through a price support programme, then private sector storage becomes less likely as price-depressing sales from the government stock may occur at any moment. Proper calibration becomes even more complex if there is a commodity exchange in place: improper government intervention in a market can destroy the prospect for success of a commodity contract (those who lost money on a commodity exchange because of the effects of government intervention are unlikely to return to the market for quite some time).

If it desires a commodity exchange to succeed, then the government should thus bind itself to certain limited, transparent forms of intervention in the commodity market. Its primary support tool should be organized commodity procurement: where it needs to buy commodities anyway (for use in the military, schools, public works etc.), the government and its agencies should systematically so do through the exchange. Other forms of intervention, such as the kind of price support programme discussed above, should be limited in scale, and executed in a predictable, transparent manner.

⁴⁰ The commodity loan programme, operated by the Commodity Credit Corporation which is administered by the United States Department of Agriculture. "the commodity is pledged as loan collateral and producers have the option of delivering the pledged collateral to the Commodity Credit Corporation (CCC) in satisfaction of the repayment of the outstanding loan for the loan at maturity." (<http://www.fsa.usda.gov/programs-and-services/price-support/commodity-loans/index>)

G. The potato case: transition from auction yard practices

If the commodity exchange project is to succeed, in the case of potato, a smooth transition from the prevailing auction yard practices to the new system is crucial. The exchange, if successful, will attract most of the potato volume from the auction yards (only potatoes which do not meet minimum exchange standards, or which can realize premium prices because of their quality will continue to be traded through the auction). The auction is run by FCBL, and FCBL will also be a critical BCE shareholder as well as its main partner for physical deliveries. FCBL is asked to give up most of its revenues from auctioning, to be replaced by fees for its future warehousing and exchange-related transport activities and at some time in the future, dividends from its shareholding in the exchange. And FCBL warehousing staff is being asked to take on new, demanding roles that moreover expose them to serious risks if they make mistakes.

So the interests of FCBL and its staff and that of the exchange have to be carefully aligned. Apparently, FCBL's auction activities are not a source of profits; and it is also exposing itself to a large credit risk as it allows the Indian buyers on the auction to pay with months of delay (at the end of March 2015, three months after the potato auctions had ended, one sixth of the Nu 60 million in credit that FCBL had given to Indian buyers had still not been repaid). Furthermore, the RGoB has recently directed FCBL to move beyond its social mandate of ensuring food security and stabilizing food prices, and to strengthen its marketing capacity as mandated in its Royal Charter of 1974. In furtherance of this new mandate, FCBL aims to effectively serve as a (temporary) portal for providing forward-and-backward linkages for farmers, through supplying farm inputs to farmers as well as support to marketing of their produce. The long-term vision of FCBL is to initiate and create conducive conditions for value chain development, after which it is gradually phasing out its role, leaving to private sector entities the ownership and/or management of value chain elements (storage, processing, transport, etc.). All of this is perfectly in line with the exchange initiative.

With respect to FCBL staff, if FCBL agrees the exchange can provide commissions to staff who support the exchange, either in the warehousing operations or as brokers. In the fee structure above, 1% of the value of the goods transacted goes to the warehouse manager and the broker (who will often be the same person); as an illustration, taking the numbers used later as estimates for future potato turnover of the exchange (in chapter 5), this would imply in the second half of 2017 a total commission for these people of over US\$ 30,000. Say that this is distributed over some 20 people... the result is a for Bhutanese salary conditions rather attractive bonus, equal to several months of normal salary. Of course, as this is FCBL staff, FCBL needs to decide whether it wants to motivate its staff to fully support the exchange through a bonus system, or in another way.

H. Contracts that can be introduced

Contracts can be considered from two angles: the underlying commodities that will be traded on the exchange; and the contractual modalities through which these

commodities will be traded. In principle, a commodity exchange can also trade indices, but this is not further discussed here.⁴¹

With respect to underlying commodities, in the current context of the Bhutanese economy, the main criteria for selection is that the exchange can profitably provide a value-added delivery mechanism for both buyers and sellers (in a few years, motives such as providing a tool for price risk management can become relevant). From preliminary research, it would appear that potatoes, cardamom and if sufficient cold storage can be provided, apples are good candidates. Research should be undertaken with industry stakeholders to identify other high-potential possibilities (exchanges normally set up “product development committees” for this purpose). For each commodity, contract specifications for standardized contracts need to be elaborated (as noted above, this is for trade on the exchange trading engine; in the warehouse receipt system standardization is not required). The following suggested standards are just on the basis of preliminary research and need to be reviewed with a representative panel, for each commodity, of industry stakeholders:

- Commodity grades. Normal practice is to accept as deliverable a range of grades, with discounts for the below-average qualities and premiums for the above-average ones. These discounts and premiums, in the Bhutan situation, can best be decided once a year, on the basis of the market situation of that year (in some international markets, such as for coffee, they are fixed, in others, for example the United States cotton futures contract, they are variable, based on fluctuating discounts and premiums in the market. However, the latter requires a market that is both fairly large and transparent, with a trusted agency –in the US case, the government–regularly collecting the discount/premium data). For example for the potato contract, before the potato marketing seasons starts, a small committee of potato industry representatives can assess the market. The Indian growing season has already finished and all relevant market information, including discounts/premiums for the various grades, is available. As Bhutan’s production is only a fraction of the massive Indian market demand, the Indian market conditions can then be used to set the forthcoming season’s discounts/premiums for deliveries through the exchange.
- Packaging standards. For example, for potatoes buyers are unlikely to accept over-filled bags (too much of the produce gets damaged), so the contract will specify that potatoes have to be delivered in bags of no more than (say) 55 kg.
- Tradable and deliverable quantities. These need not be the same; for example, for potatoes one could trade 1 tonne contracts, but in order to ask for delivery, one would have to buy 4 contracts to arrive at the deliverable quantity of 4 tonnes. However, in the Bhutanese case where delivery is primordial (at least in the short- to medium-term), it is preferable to make only

⁴¹ Nevertheless, a rapid scan on the possibility to introduce index-based contracts can be worthwhile. Such contracts are not settled through physical delivery, but financially, on the basis of the development of the underlying index. There are three main types of such contracts: pure indices, eg indices for weather data; indices based on the prices realized on Bhutanese markets for certain crops; and indices based on international commodity prices. The first two types are quite complex, but the latter are quite simple and there may be demand in Bhutan – for example, for contracts based on international gold prices, or international crude oil prices. It should be kept in mind, however, that in the absence of physical delivery most contract use is likely to be for speculative purposes.

deliverable quantities tradable. 4 tonnes seems a reasonable number for a potato contract (it is half a truck load, and within reach for most farmers), but one would have to determine with an industry panel whether this is indeed the case. The sales price is determined on a per kg basis, and the contract normally leaves a reasonable margin around the contract, for example 10%. In other words, until he is sent the delivery notice by the exchange and asked to pay the full contract amount, the buyer of one 4-tonne contract only knows that he has bought between 3,600 and 4,400 kg. This is a minor inconvenience for buyers, but a major advantage for the farmers who have to try to aggregate potatoes in volumes that are accepted by the exchange.

- Delivery locations. As noted earlier, there will be delivery locations into which farmers can deliver their produce, and locations in which FCBL, as the exchange's transport agent, can deliver produce to buyers. For practical reasons, it can be decided that certain delivery-in locations can only be linked to certain delivery-out locations (eg, potatoes from the East of Bhutan can only be delivered to the Eastern border towns, not to Phuentsholing). The contract specifications should permit flexibility to the buyer to negotiate alternative delivery locations with FCBL. FCBL should also be proactive in trying to deliver to locations where the highest possible number of buyers is able to take delivery (eg, for niche market products with buyers who are unable to take delivery in Bhutan, FCBL may wish to offer delivery from a warehouse at an Indian port).

With respect to the nature of the contract, there are quite a few possibilities, but only the first one is feasible from the start of the exchange:

- A spot delivery contract: farmers put their crop in a warehouse, offer the warehouse receipt they receive for sale (which can be at a price that is not met by a bidder for several days or even weeks), a buyer makes an acceptable bid, and ownership of the goods is transferred (the buyer may decide to keep the goods for some time in the upcountry warehouse, or to have them transported at once). Delivery can be through the exchange trading system (for standardized commodities) or through the trading functionalities of the warehouse receipt system. This is likely to be a mainstay of the exchange in its first year.
- A forward delivery contract: a seller offers for sale commodities which he does not own yet for delivery at some time in the future. This can be a short sale, where the seller expects to be able to buy the commodities before delivery is due; or a sale by a farmer of crop that he expects to have harvested by the time of the planned delivery. This requires the exchange to have a robust risk management system in place; to avoid default risk, both buyer and seller will have to put up margins (guarantees) with the exchange's clearing house, and these margins should be adjusted to changing market conditions during the life of the forward contract. From a volume perspective, this kind of contract is not likely to become popular until stakeholders are more familiar with exchange mechanisms.
- A futures contract: looks at first sight like a forward contract. However, the seller has no intention of making delivery, and the buyer has no intention of taking delivery. Instead, both expect to close out their transaction through a financial operation. Futures need to be margined each day, and are thus very demanding for users and their banks. Moreover, illiquid futures are unattractive because it will be difficult for holders of futures to find a

counterpart to close out their position. It is likely to take years for BCE to have enough volume to support futures, and for most agricultural commodities⁴², the time may never come.

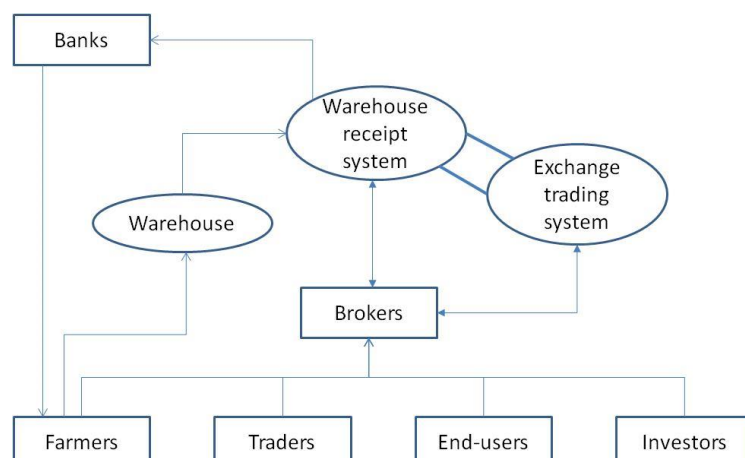
- An option contract. For the buyer, an option contract can look attractive: by paying a one-off premium, he receives protection against either price rises or price falls, depending on the type of option he buys. However, one can only buy options if there are sellers, and for selling options one needs to be able to manage the price risks of options through liquid futures markets. So options will be impossible for at least as long as there are no liquid futures.
- Commodity repo contracts. These would be traded on the warehouse receipt system, not on the exchange trading engine. Under a repo contract, an investor (for example, a bank or an insurance company) buys (at the full price) commodities (say today, $T=0$). At the same moment, he enters into a contract with the seller obliging the latter to buy back the same commodities later (say in thirty days, $T+30$) at a slightly higher price. The price difference between the purchase and the sale represents the interest earnings of the investor over the, in this case, 30-day period. The seller's repurchase commitment is guaranteed by the seller's broker, who is in turn re-guaranteed by the exchange clearing house. Thus, commodity repos represent fixed rate commercial paper, with standard maturities (say 30, 60, 90 days), and they may be an interesting treasury management tool. Once it has a good warehouse receipt system and an active brokerage community, there is little that stops the exchange from introducing this kind of contract.
- Structured receivables notes. In this case, the exchange structures a value chain, say for poultry, from producer to processor. In the beginning, an investor buys exchange-traded paper which promises certain guaranteed returns in 30 days. The payment sum is used to buy young chicks, and to buy chicken feed. Thirty days later, the chickens are sold to a slaughterhouse, and the proceeds are used to repay the investors. This type of structure, used in Colombia, is interesting for Bhutan. But it is unlikely that exchange staff will have any time soon the investment banking skills required to properly structure such notes (which impose strict risk management for all segments of the value chain). This can perhaps be considered when the exchange has reached a certain level of maturity.

I. Key actors and their potential roles

Figure 3 gives a simplified overview of the key actors in the prospective Bhutanese commodity exchange ecosystem, and describes how they interrelate with the commodity exchange core systems (as described in the previous sections). This section discusses the most relevant characteristics of each of these key actors, as well as the modalities of their interaction with the commodity exchange and with each other.

⁴² In fact, given the size of Bhutan's agricultural sector, the chance of an "independent" futures contract reaching sufficient volume to survive is very small. However, there may be scope, at some future time when Bhutan's market participants have reached greater sophistication in their understanding of market-based instruments, for a "pass-through" contract, in which a Bhutanese (potato) futures contract is linked with an Indian potato futures contract and through active arbitrage between the two contracts, benefits from the latter's liquidity. Further discussion of this goes beyond the scope of this paper.

Figure 3
Simplified overview of the key actors in a Bhutanese commodity exchange



Source: authors

E.1 Warehouse operators

The process of approving warehouses, and of the services that warehouse operators have to provide have been elaborated above.

E.2 Brokers

Brokers play a crucial role in commodity exchanges, and Bhutan will not be an exception. In an electronic exchange, contrary to an open-outcry exchange, brokers are no longer primarily a pass-through, to execute clients' orders. Rather, they will act as gatekeepers, approving clients as "fit" for trading on the exchange, and then providing them trading limits. They also have important promotional, advisory and training roles, and need to be empowered/supported to play these roles

In principle, the exchange could operate as a "closed direct system". All prospective users then have to register with the exchange. The exchange does the necessary due diligence to ensure that these users are fit for trading on the exchange, and able to meet their contractual obligations. Most procurement platforms function on this basis, but for a commodity exchange this is impractical – it would be overly complicated to ensure continuous due diligence on a large number of exchange users.

All major electronic exchanges operate "open indirect systems". In such systems, prospective users have to register with a broker, which has to approve them (using standard "know-your-customer" forms before they get access to the exchange). Each individual broker (ie, each person having client-facing responsibilities with a brokerage company) needs to have received a brokerage license, for which they have to pass an examination, and they have to meet certain criteria (eg, no criminal record). Each user has a unique client code, and all transactions for that user are done under this code. The user may pass his orders through the broker, or he may be given his own trade work station (which can be in the form of a mobile application that allows him to trade from his mobile phone) and trade by himself (this is called Direct Market Access), within limits set by the broker.

In the case of Bhutan, the commodity exchange will operate not only a trading platform, but also a platform that permits farmers and others to manage their warehouse receipts and use them, among others, as collateral for finance. So brokers will have to be able to use both platforms, and provide both kinds of services to clients.

The exchange manages its risks at the broker level, not at the user/client level. In the risk management model approach that is most appropriate for the Bhutanese context⁴³ (and which is used in India and Pakistan) each broker has trading limits that are directly linked⁴⁴ to the margins that they have deposited with the exchange (RSEB's software is configured for this model). Brokers in turn manage the risk at the user level, in particular through the limits set on each client's trade. The exchange software should include functionalities that permit brokers to do this – as is the case for the software used by RSEB for its securities trading. The exchange will regularly verify whether brokers treat their clients properly, through scheduled and unscheduled inspections, and through the automated analysis of client-level transactions.⁴⁵ The exchange or, in a more developed form, the association of brokers will also operate a dispute settlement system, to receive and act on client complaints; and brokers will contribute to a guarantee fund that permits pay-outs to clients who have made losses due to dishonest brokerage behaviour.

In the Bhutanese context, who can act as commodity brokers? One can consider the following:

1. FCBL warehouse operators

FCBL as well as each other approved warehouse operator can get a brokerage status, and then appoint one or more of its staff in each of its warehouses to act as a broker (they will, of course, be individually assessed and registered by the exchange, and they have to pass the brokerage examination set by the exchange). These brokers will be the frontline agents for bringing farmers to the exchange, and to the warehouse receipt financing schemes that are offered by banks to farmers who possess warehouse receipts.

Like all other categories of brokers, they need to be directly connected to the exchange trading engine, through brokerage software (ideally on a computer (desk top/lap top), but ideally, trade through a mobile phone should also be possible. Each broker has a unique identifying code with a password known only to him and the

⁴³ The alternative is a model (used in developed country exchanges) in which only companies with high credit ratings are accepted as brokers.

⁴⁴ The link is through a mathematical formula, which, in approximate terms, ensures that the margin deposited with the exchange is sufficient to cover at least two days of unfavourable price changes, given the at that time prevailing price volatility of the different commodities traded by the broker. If the risk implicit in a broker's position approaches his margin funds lying with the exchange, the broker receives a warning, and can deposit extra funds; or if he does not do so, he risks that if prices move against him, his position will forcibly be closed out by the exchange. The software used by RSEB for its securities trading supports this form of risk management.

⁴⁵ For example, imagine that in the morning, a broker gets an order from his client to sell 1 lot; the trade will be done, with the proper client identification code. Later in the day, prices have fallen. The broker can then (claiming a mistake in the original input) change the identification code on the first trade to one that belongs to a broker-owned company, and close out the position with a profit. At the same time, he sells another lot, on behalf of the client... who thus realizes a lower price than he should have done. Many such abuses are possible, but trade surveillance software and inspections of the broker's books can detect most of this.

exchange; and this identifying code is “mapped” to the computer and/or mobile phones that the broker normally uses to access the exchange (in other words, if the code is stolen and the thief tries to access the exchange through a computer which is not registered to the broker, his attempt fails). FCBL will set limits on what the kind and volume of transactions that each can do on the exchange. Over time, brokers should be empowered to give direct market access to their largest and most savvy clients; the brokerage risk management system has to be able to manage the related risks by imposing strict trading limits on such clients (this kind of risk management is standard with many exchange solutions, including that currently in use at RSEB).

These warehouse operators will have the following exchange-related functions:

With respect to commodity finance:

- They ensure that a farmer’s deposits are properly registered as an electronic warehouse receipt.
- They provide farmers with the proper access codes so that they can use their electronic warehouse receipt accounts.
- If a farmer so wishes, they help fill out the electronic forms that permit the farmer to get a loan against these warehouse receipts.

With respect to exchange trading:

- They are able to advise farmers on exchange operations, including in terms of the quality specifications of the contracts, prevailing price levels (and the premiums/discounts that the farmers can expect for their specific lots).
- They can open electronic trading accounts for farmers.
- They can provide sufficiently qualified farmers with their own mobile applications so that they can trade directly if they so desire (within trading limits set by the FCBL operative).
- They can place sale orders on the exchange on the farmers’ behalf.
- They ensure the proper dispatching (marking, loading) of the lots bought on the exchange.

2. Farm Shop operators

The Department of Agricultural Marketing and Cooperatives (DAMC) and FCBL are jointly developing a network of Farm Shops; it is envisaged that FCBL will manage them. Under current plans, the Farm Shops offer three functions, namely to provide farm inputs, to provide consumer goods and to support contract farming⁴⁶ (for this purposes, they will have basic storage space for different commodities). The Farm Shops also have the mandate to facilitate the sale of surplus production by farmers to schools, hospitals and monasteries. The goal is to establish, by 2018, Farm Shops in all 205 geogs of Bhutan. As of March 2015, the first three Farm Shops are being established, and 12 more are to be set up by the end of 2015. Farm Shops can be given a fourth function, to act as brokers for exchange trading (not for warehouse receipt finance), along the lines discussed in the previous section. In fact, BCE may want to discuss with DAMC 1) the possibility for the exchange to act as a mechanism to sell the “surplus production” bought by the Farm Shops, to both national and international buyers; and 2) the possibility to link with institutions such as schools etc.

⁴⁶ Contract farming arrangements will be between FCBL and farmers, with FCBL guaranteeing prices, and after delivery grading, sorting, and forwarding the produce to larger collection centers (Sonam Norbu and Kailash Pradhan, Concept and Operational Plan of Farm Shop, Department of Agricultural Marketing and Cooperatives, Ministry of Agriculture and Forests, September 2014).

through the exchange rather than directly, with transactions driven by demand from these institutions rather than by sales of excess produce by the Farm Shops.

3. Export trading houses

It is expected that export trading houses that trade in the commodities offered on the exchange will become exchange member – at the very least, they will be able to use the exchange to more easily procure commodities. But some may also be interested in setting up separate brokerage networks, with as initial clients the various actors that they have been interacting with in their day-to-day business so far (for example, large farmers, middlemen, end-buyers of Bhutanese commodities).

4. Securities brokers

It can be expected that some of the companies that are now active on the securities exchange are interested in diversifying into commodity brokerage. In first instance, these brokers are likely to focus on the urban market: large Bhutanese buyers of commodities (processors, hospitals, monasteries etc.) as well as on investors who wish to place some of their funds in warehouse receipts (they buy a warehouse receipt, leave the goods in place, and then offer the warehouse receipt for trade after a certain time). Later on, they would probably use their informal network (eg, family links) to start brokerage operations on the countryside, in competition to the FCBL operators.

This group of brokers is very important for the success of the exchange, as they are the best placed to bring “non-trade interests” (also, in a bit of a misnomer, called “speculators”) into the exchange. These non-trade interests are critical for the exchange because they make trade fluid. Physical market participants tend to operate in a one-directional manner: they buy, or they sell. As their decisions may be influenced by similar factors, it is likely that in certain times, most are only interested in selling, and at other times, most are only interested in buying (or at least, not interested in selling). Naturally, if this is the case little or no trade will actually happen. Non-trade interests are driven by different motives, and tend to intervene when the physical market shows one-sided behaviour – if all physical participants want to sell, they buy; and vice versa. Within the group of non-trade interests one finds different kinds of behavior. For example, some may close out their positions within a day, others may hold positions for many weeks or even a few months. On well-developed markets, there is much more trade by non-trade related interests than by physical market participants, which is of great benefit to the latter: they can feel reasonably assured that at any time they want to do a trade, there will be a counterparty.

5. New independent brokers

The dynamics of an exchange are such that after some time, certain people will be interested in becoming independent brokers. For example, a progressive farmer who sees that his neighbours feel uncomfortable with using the exchange can start acting as their representative. The exchange needs to have a training and certification programme for such individuals; and the banks with which the exchange operates have to be ready to open accounts for them.

E.3 Traders

There are many traders in Bhutan, playing different roles – from the small traders (often called “suppliers” in Bhutan) who collect crops from the farmers, to the large export trading houses who interact with global buyers. If there is an operational

commodity exchange in Bhutan, many will be affected. For commodities traded on the exchange, and to the extent that the exchange manages to reach the rural population, it will become very difficult for these traders to continue making profits on the basis of large informational advantages. Nor can they exploit gluts in the market, or lack of competition between buyers, to press prices down – with the exchange linking Bhutan's main markets, crops no longer enter into a local market but into a national one, with buyers and other actors no longer limited to operating in the place where they are physically present.

But while important traditional sources of trading profits will disappear, the exchange will create important new business opportunities for traders, and in particular, for the large trading houses. The following can be mentioned:

- Ability to procure in volume, and being able to respond to demand
- Financing working capital needs without locking up capital assets
- Quality control functions of exchange
- New trading opportunities (crops, cash and carry operations)
- Opening up of brokerage offices.

E.4 End-users

End-users are large commodity buyers in Bhutan: the army, boarding schools, monasteries, hospitals as well as processors. They would normally open an account and trade through a broker, probably one of the better established brokers that already have a track record on the securities exchange. They can respond to offers on the exchange to buy the commodities they need; or they can be the drivers for trade, giving specific orders to the exchange to help procure certain volumes of commodities. The former may well suffice for bulk commodities, but for more specialized commodities the buyer may be expected to take the initiative, and announce a purchase price and purchasing time window; the exchange will then “translate” this into delivery prices at each delivery location.

E.5 Investors

Investors are people or companies with liquid cash who wish to use the exchange contracts as investment instrument, for example because they believe they can thus achieve higher returns than on a bank deposit. Investors normally trade through brokers, and the exchange has a duty to ensure that brokers do not dishonestly entice investors into trading on the exchange. For this purpose, the exchange will force licensed brokers to publicly display posters which explain the risks of exchange trading for investors, and the rights that investors have. They will also enforce (through rules and controls) proper due diligence by the brokers on their investor clients (can they really afford to trade on the exchange?), and proper documentary relations between brokers and investors (eg, an initial form in which the investor certifies to understand the risks of trading; regular trading reports; and records of the instructions given by clients to their brokers. The exchange will also operate surveillance software to detect suspicious behaviour by its brokers (such software tends to be part of the package of exchange software).

Investor protection has to be a key function of the exchange. In nearby countries, there are considerable problems with illicit forms of commodity exchange trading, in which dishonest brokers fleece small investors who have only limited understanding of financial markets and who are all-too-ready to believe empty promises such as high guaranteed returns in commodity market transactions. The exchange needs to focus, the tools and the powers to combat such undesirable practices.

J. Technology issues

A modern exchange is a technology company. Technology has greatly benefited exchange users, vastly expanding the reach of exchanges and greatly reducing trading costs; indeed, with the technology of as little as ten years ago, one could not have envisaged the possibility for a viable commodity exchange in Bhutan.

The following technology issues merit to be highlighted:

- A robust system consists of separate modules which are interconnected through messages in and out; a fully integrated system is vulnerable, and updating it would be difficult. The system currently envisaged for BCE meets this criterion.
- The system needs to have risk management capabilities that go beyond those offered as standard on the common American and European exchange systems, in particular the ability to operate a pre-margining system, and the ability from the exchange down to exchange users to set specific limits for each contract. The system currently envisaged for BCE meets these criteria. A pre-margining system forces users to first pay in guarantees into the exchange clearing house, and then their ability to trade up to the levels covered by these guarantees is unlocked. Western exchanges work on the principle of post-margining, in which people first trade, and then at the end of the day are asked to put up the required margins. The Western system works because only highly-capitalized entities are permitted to trade directly on the exchange, but such a limitation would strangle a commodity exchange in Bhutan.

The ability to set specific limits at all levels of exchange trading permits not only the exchange to limit its risk exposure, but also to companies with many brokers (like FCBL) to ensure that none of its brokers trade beyond FCBL-set limits; and in time, it makes it possible to allow larger clients to trade directly on the exchange, within limits set by the broker. In India, the latter has proven a very effective tool to get companies to start using the exchange.

- Trading through mobile phone should be possible – reliable internet does not yet reach far enough (in any case, even if there is good internet it is useful to have a back-up option). The system currently envisaged for BCE does not yet offer this option. But it appears the vendor has worked on this and is able to offer it as part of an exchange solution.
- Interfaces are critical. If an exchange clearing house cannot communicate electronically with the back office of a bank that provides payment services to exchange clients, then considerable delays can arise. In tailoring exchange software to the Bhutanese market, particular care has to be given to the various interfaces so that on the planned launch date, all work well.
- The technology chosen should be easily maintainable and highly robust (with trading down due to technology problems less than 0.01% of the time). Causes of technology breakdowns may lie in hardware, the environment on which this hardware depends for functioning, the environment on which users rely in order to use the exchange, software, and the human operators of the exchange system. The risk mitigants are evident, although not necessarily easy to implement:

- Choice of proper hardware, sufficiently powerful to meet anticipated use
 - Placement of the hardware in a proper environment (eg, high-power computers and servers need exact temperature control)
 - Backup systems for data protection (preferably offsite, to mitigate the risk of location-specific disasters, e.g. flooding, fire or terrorist attacks)
 - Backup systems for power supply
 - Proper software, and arrangements to deal with software problems
 - Multiple mechanisms for users to access the exchange (phone, leased lines, satellite connections, Internet...)
 - Protection of the exchange software and hardware against outside tampering, eg, all servers should be placed behind a firewall.
 - Protection against outside interference in client-exchange communication, by the use of strong encryption technology.
 - In general, there should be redundancy in the system – in hardware, data management, communications, power, air conditioning for the equipment...
 - Qualified and properly trained exchange staff, with operational procedures that provide strong checks and balances.
- It should be easy and cheap to add new contracts of any type into the exchange systems, and the systems should be upgradable. In the case that one invests in developing proprietary technology, this can be a major bottleneck – a small, emerging exchange may not be able to afford to work on upgrades. So using technology that is being used by another exchange which does have the funds for upgrading, with a contract that gives access to these upgrades, is preferable.

K. Ownership and governance issues

BCE should be incorporated as a for-profit company (initial shareholders may however agree that no dividends will be paid out until preparations for a public sale/Initial Public Offering start). At around the time that BCE is incorporated, the RGoB has to take measures to block other companies from using the words “commodity exchange”, “mercantile exchange” and variations thereof in their name. BCE will be working on ensuring that the large public identifies the words “commodity exchange” with “trade with trust”, and less reputable firms should not be permitted to use this denomination to attract unsuspecting customers and fleece them (one may want to look at the situation in Nepal as one that the RGoB may want to avoid).

BCE’s shareholders should be strategically chosen. FCBL probably should be the main shareholder, given that it is expected to make its warehousing facilities available (against a fee) to the exchange, and arrange transport from upcountry warehouses to the delivery points. RSEB will bring in the commodity trading system and know-how on managing organized electronic markets and, at least in the short-to-medium term, provide technology and marketing functions to BCE. A range of banks⁴⁷ should be brought in to cement the position of BCE as a link between the agricultural and financial communities – their shareholding will encourage banks to introduce warehouse receipt financing facilities, and to provide other facilities to exchange users. An institutional investor like the Royal Insurance Corporation of

⁴⁷ It should be noted that the Bhutan Development Bank Ltd. and the National Bank of Bhutan (of which IFC, part of the World Bank Group, is a shareholder) are among the members of the Committee empowered by the Royal Government of Bhutan in May 2014 to support work towards the possible establishment of a commodity exchange in the country.

Bhutan Ltd. (RICBL) can anchor the venture, and help provide it with necessary working capital until the exchange reaches break-even.

The exchange needs premises, computer hardware (preferably including a disaster recovery system, although this can be left until a certain volume is reached), and staff. Initially, certain services can be outsourced to RSEB (against a fee), but certain core staff and functions have to be within BCE itself. However, certain services would best remain outsourced. For example, BCE should not become the owner of warehouses or trucks but instead pay others, in the short run FCBL in particular, for warehousing and transport services. The core management team has to include a CEO to provide overall oversight and to liaise with external stakeholders and the government; and a COO to provide day-to-day management of all operations. Other core staff include a head of marketing (responsible for outreach to and training of prospective users), and a head of strategy/research. Functions such as human resources management, procurement, IT, administration and financial management can be outsourced in the short term (in practice, RSEB can provide these services).

The new entity would have to be given a license to operate a commodity exchange (either under an explicit licensing regime or under a government decree). Not every company should be allowed to start exchange operations: there are too many things that can go wrong, and too much of a potential impact of improperly managed operations on producers, exchange users and society as a whole. A commodity exchange has to abide by certain criteria and conditions in order to be given a license, and then to keep it. These criteria inter alia include financial soundness, honest management, independence from any group of market users (ie, the trading platform and the way it is operated has to be unbiased), and transparency. These conditions are very similar to those under which a stock exchange operates, and under Bhutanese conditions, it would make sense to have the same authority that licenses RSEB and oversees its performance – i.e., the Royal Monetary Authority (RMA) – as responsible for licensing and overseeing BCE, under the same Financial Services Act. If this is not possible and, at least temporarily, the exchange will be largely self-regulated (other than aspects of its functioning that are governed under the Companies Act and other legislation), then transparency as a tool to ensure proper exchange operations becomes of prime importance.

Exchanges can operate under a “seat” model (with a limited number of seats available for sale to interested parties), or a membership model (everyone who meets the criteria can become a member). Experience shows that the latter is much more effective at improving exchange turnover, and it is advisable for Bhutan.

The exchange is a self-regulatory organisation. It needs to have sound bye-laws, and a broad set of internal operating policies and procedures. In order to enforce these various rules, it operates active surveillance programmes (eg, to detect and then investigate market anomalies or anomalies in the trading behavior of brokers), and it operates a number of committees chaired by members of the Board. The committees, inter alia, oversee the external components of the exchange ecosystem (eg, the performance of brokers, with the possibility of fining, suspending and expelling brokers who break the rules) and the performance of the delivery system.

Chapter 4

OPERATIONAL CHALLENGES FOR COMMODITY EXCHANGE DEVELOPMENT IN BHUTAN

There are four broad phases in commodity exchange development, each of which has its own challenges. Table 3 below gives an overview of the four phases and the key mission-critical issues in each phase.

Table 3
The four phases of rolling out a commodity exchange

<p>Phase 1: Conceptualization</p> <p>During this phase, it is decided:</p> <ul style="list-style-type: none"> - what services the exchange will offer; - what products it will look at introducing; - what strategic partnerships are possible; - what core team will lead the development of the exchange; - what technology package(s) will be necessary; - what clearing arrangements will be used <p>Furthermore:</p> <ul style="list-style-type: none"> - the necessary budget will be analyzed, - timelines will be determined - brokerage criteria and examinations will be elaborated - potential legal and regulatory issues will be identified and resolved. <p><i>Key issue: this phase should be done properly, so that the next phase, which has considerable capital outlays, can be done as fast as possible.</i></p>	<p>Phase 2: Implementation</p> <p>From the first big investments (recruiting the core team, and then, investing in the technology) to the start of trading. Many activities need to take place in parallel. Marketing, product development, installing and testing the necessary technology, signing agreements with partners, deciding on outsourcing practicalities, recruiting and training necessary supporting staff, writing exchange regulations, setting up internal arrangements (internal guidelines, reporting arrangements, responsibilities, committees, etc.), identification, signing up (ie, training and then, seeing them pass the brokerage examination) and motivating of brokers.</p> <p><i>Key issue: this phase needs to be executed as fast as possible, as costs are high and there is not yet any revenue, without compromising the successful introduction of trade.</i></p>
<p>Phase 3: Start-up</p> <p>From the introduction of trading until reaching break-even point. Careful and well-judged cost control, steady introduction of new contracts, fine-tuning operational procedures (with volumes still low, there still is room to correct small errors), building up public reputation, widening geographical reach (including by introducing more brokers and delivery points), consolidating internal operational arrangements.</p> <p><i>Key issues: cash flow management, continuous marketing, and enforcing disciplined behaviour of brokers (ie, ensure they do not abuse clients).</i></p>	<p>Phase 4: Maturity</p> <p>Positive cash flow. Need to maintain momentum (which may require changes in decision-making, shareholder structure and salary structures), and the appropriate time to stabilize exchange operations (e.g., introduce more costly back-up systems/disaster recovery processes).</p> <p><i>Key issues: need to maintain close links with stakeholders (outward-looking rather than inward-looking approach), continue process improvement, remain vigilant on possible market abuses, and continue product innovation.</i></p>

A. Conceptualisation

During the conceptualization phase, the roadmap towards the creation of the exchange is spelled out, in great detail. The choices made during this phase will have a critical impact on the shape of the exchange for many years to come. Mistakes can cripple the chances of success of an exchange.

This phase has to be well-managed, and all key aspects of the future exchange (product range, ownership, technology, staffing) need to be thoroughly covered. The critical bottlenecks need to be identified, and it needs to be ascertained that they can be remedied in time. Timelines towards the launch of exchange trading need to be elaborated. If done properly, the conceptualization phase lays the foundation for a rapid execution in the implementation phase.

In the context of the work done so far in Bhutan, the following are the remaining urgent tasks:

- Agree on the structure and shareholding of BCE, and incorporate it as a company
- Decide on the core team that will lead the development of the exchange (in particular, choose the BCE CEO).
- Spell out the specifics of the technology package(s).
- Elaborate brokerage criteria, and get work started on the drafting of the broker examinations (the actual work can be outsourced to short-term consultants).
- Set the criteria for exchange-approved warehouses.
- Elaborate the contractual arrangements for outsourced activities (with RSEB and FCBL).
- Elaborate contract specifications, in collaboration with value chain stakeholders.
- Draft BCE bye-laws, rules and regulations (this work should be outsourced).
- Identify and discuss potential donor support.
- Determine timelines for the various activities, and allocate responsibilities among the team members.

The following issues merit to be highlighted:

- **Positioning of the exchange (mission statement).** The exchange cannot just be a platform, a more efficient way for prospective users to do what they are already doing. It also has to provide new products and new services that hitherto were unavailable to its future clients. The exchange needs to formulate its *raison d'être* in terms of its game-changing product/service offering.
- **Product choice.** The focus of the exchange development team is currently on agricultural commodities, and in particular “bulk commodities” like potatoes, cardamom, apples or ginger. A quick scan of opportunities in other sectors would be useful. For example, on Nepalese exchanges a lot of gold and silver are traded – would these be interesting for Bhutan? With respect to niche market commodities (such as lemon grass or azuki beans), can the exchange perhaps tie up with international buyers to offer certain guaranteed prices for delivery at exchange warehouses? Bhutan has large mineral exports – is there a possible role for the exchange?

- **Target buyers.** In the exchange initiative so far, the focus has been on the current buyers of Bhutan's main export commodities. It would be worth for the exchange to explore whether it can play a role as a procurement mechanism for large organized buyers in Bhutan (such as FCBL, for its school meal programme, or processing plants, or buyers such as the army). Also, can the exchange provide a more direct link between Bhutanese farmers and the final buyers of Bhutanese produce in Bangladesh and India (eg, would these buyers be interested in having a BCE terminal in their offices, and could FCBL, rather than delivering at border towns, arrange delivery directly at the buyer's premises is, say, Siliguri, or in Bangladesh?⁴⁸
- **Supporting software.** If the BCE is to reach deep into the countryside, it needs to provide the tools to prospective users to trade on the exchange and make related payments through their mobile phones. For this, brokers need proper risk management systems through which they can safely give trading limits to their clients (this is part of the RSEB software package and can presumably be replicated for the commodity exchange). But also, a mobile application needs to be added to the trading software; and practical arrangements need to be made with banks for an efficient e-payment system. Technically, none of this should pose real problems, but the various processes involved in realizing this (software development, including eventually in local languages; negotiations with telecom providers and banks) can be time-consuming. It is mission-critical that these facilities work on the day that trading starts and timelines need to be established to ensure that this indeed will be the case.
- **Exchange ownership.** Companies like RSEB and FCBL may be the drivers behind the exchange initiative, but the need to bring strategic partners on board. Such partners will have to offer more than just money. It can be access to technology, upgrading of reputation, access to potential clients, securing of certain core services... In the case of BCE, given the central role of warehouse receipt finance in its service offering, banks will need to play an active role, and bringing them into the exchange will cement the position of BCE as a link between the agricultural and financial communities.
- **Profit or non-for-profit.** While an exchange fulfils many publicly useful functions, it is not a public utility. It should be aggressively growth-oriented, and will need profits to finance its expansion. However, the decision can be made that until an IPO date is planned, all profits will be plowed back into growth; only after that, dividends will be paid.
- **Exchange licensing.** A commodity exchange, just like a securities exchange, should require special permission to function (and the use of "commodity exchange" in a company's name should not be permitted except if the company is mandated to operate as a commodity exchange). This can be through an explicit mandate, or through a licensing process under which

⁴⁸ This requires coordination with India's regulatory agency for commodity exchanges, the Forward Markets Commission (soon to be integrated into the Securities Exchange Board of India, the securities market regulator). Although the rule is widely broken, it is normally not permitted to have trading screens of international exchanges in India. But given the special relationship between Bhutan and India and the nature of the contracts that are likely to be introduced, there is a good chance that regulatory permission on the Indian side will be given.

candidate exchanges have to argue that they will be able to meet certain performance criteria; then get a provision license to prove that they are indeed able to do so; and once they receive a full license have to demonstrate from time to time that they continue meeting the government's requirements.

The licensing regime is preferable, as it sets clear standards to the performance of the exchange. But it may not be feasible in Bhutan. Establishing the exchange through an executive order can be an alternative. It puts, however, a high burden on the self-regulatory performance of the exchange, and this will require the exchange to have a strong management and Board.

In any case, whether the exchange is licensed or directly mandated through an executive order, the path to the establishment of the exchange as a corporate entity has to be clear – and this path will have to provide for a rapid process, if a target of starting exchange trading by 1 July 2016 is to be achieved.

B. Implementation

During this phase, the plans made during the conceptualization phase are implemented, and an exchange ready to start trading is created. The focus has to be on implementation – there should no longer be any debate on fundamental issues/choices during this phase (unless it is found that some of the assumptions and thus, plans made during the conceptualization phase were wrong and it is necessary to adjust). This phase has to be executed as fast as possible: costs are high, and there is as yet no revenue. Delays can threaten the financial viability of the venture.

In the context of the work planned in Bhutan, the following issues merit to be highlighted:

- ***The promoting team.*** The inception phase of an exchange, like that of any other company, needs to be driven by a tight, dynamic group of people who together have all the skills, competencies and connections necessary for success. In a small country like Bhutan, demand for talented individuals is often high, and it may not be that easy to get a strong team together. It would need a team at the least 10-12 months to go from the current phase of preparation to an exchange ready for trading. If 1 July 2016 is the target date for the launch of the exchange, that does not leave much time to get all members of the promoting team in place.
- ***Product development.*** In the conceptualization phase, products that provide good prospects for the exchange have been identified. During the implementation phase, contract specifications need to be written for these products, and arrangements need to be made to enable trade in these products to go smoothly. Contract specifications are normally developed jointly with a panel of prospective future users of the exchange. This permits not only to define specifications that fit closest to the needs of the sector's stakeholders, it also makes it possible for the exchange to create a feeling of "co-ownership" of the contracts with the stakeholders – who will thus feel more inclined to do their utmost to ensure that the contract will be a success. With respect to the arrangements for trade to go smoothly, this includes issues such as the smooth performance of the delivery system (eg,

commitments from warehouse managers and transport companies on the timeliness, quality and costs of their services), and a system that gives stakeholders real-time access to price information.

- **Brokerage system.** Given the prevailing auction yard and direct marketing practices in Bhutan, brokerage houses, both on buyer and seller side, are non-existent (contrary, for example, to the situation on India's auction yards, where both seller- and buyer-oriented brokers have a wide presence). But in the future commodity exchange environment, brokers will be the prime link between the exchange and its users. Brokers also need to be vetted by the exchange, and to pass a broker examination. In an electronic exchange, brokers no longer need to be the pass-through, to execute clients' orders. Rather, they will be the gatekeepers, providing trading limits to clients. They also have important promotional, advisory and training roles, and need to be empowered/supported to play these roles.
- **Language issues.** Many of the existent Indian buyers as well as many Bhutanese smallholders do not speak English. If buyers and smallholders are to interact with the commodity exchange directly, the system needs to be accessible in English, Hindi, Dzonghka, and potentially some of the local Bhutanese dialects. This will add to the time of developing written materials, software front-ends and the like, and the promoting team needs to ensure that the necessary work is done in time for the exchange launch.
- **Exchange technology.** While the core "engine" may be off the shelf, a considerable amount of tailoring may have to be done, in particular with respect to the interfaces (the way that potential users, banks, information vendors etc. interface with the exchange). Brokers and banks need to be able to test the technology and train their staff on its use, which implies that it should be available for testing at least three months or so prior to the launch of exchange trading.
- **Payment/clearing/settlement systems.** The exchange needs easy and very fast financial procedures for users. This will require the active cooperation of at least one bank. Currently, the practice in Bhutan's agricultural trade is that all transactions are settled through payment in cash. Financial literacy across both farmers and Indian traders is very low. Most participants do not have a bank account yet. However, the Bhutanese banking system has developed to a stage where online banking and mobile banking are available with all five banks for intra-bank transactions (digital inter-bank transactions are not possible yet, but the Royal Monetary Authority (RMA) is currently working on a National Fund Transfer System to close this gap; meanwhile, Bhutanese inter-bank transactions are executed through demand drafts). Digitally executed cross-border transactions from Indian accounts to Bhutanese accounts are also working well. The conditions for the exchange developing a proper payment system are thus in place.
- **Rules and regulations.** An exchange is a self-regulatory organization and needs many rules and regulations. These need not be written from scratch – there are good models available in India, for example. But such models will have to be adapted to the specific conditions of the BCE, and the voluminous results will have to be approved, generally both by the exchange and by its supervisory Ministry. The processes involved can be time-consuming. Rules and regulations need to be ready and available to prospective exchange users before trading starts. This work should therefore not be left until late.

- **Awareness-raising and training.** The day that trading starts, prospective users need to be fully aware and trained for using the exchange. In particular the six months before the launch of trading therefore tend to have a very intensive awareness-raising/marketing/training programme, from short (2 hour) sessions across the country (through a roadshow) to longer training programmes for brokers. It should also be kept in mind that brokers need to be licensed in order to trade on the exchange, and the exchange will have to arrange their training as well as their examinations. Training materials and broker examinations (including in local languages where useful) have to be prepared prior to the start of the intensive marketing programme, ie during the second half of 2015.

C. Start-up

Once the exchange starts trading, its management and staff will be faced with a new array of challenges, many of which will only lessen when the exchange reaches its break-even point. Good cash flow management is critical during this phase, and this should not be permitted to compromise the exchange's growth potential. The performance of the warehouse receipt trading software and of the trading engine has to be closely monitored: if there is a failure of either and the resulting problems are not handled well, this may well discourage market participants from future use of the exchange. In terms of market development, the exchange should focus on reach, expanding its network of brokers and its delivery points. The exchange also has to interact closely with its users, to detect possibilities to improve contract specification, delivery mechanisms or other aspects of the exchange's functioning.

While work to promote the initial contracts is going on, the exchange has to start developing further contracts. Apples, oranges and cordyceps are worth looking into. Also, if the rapid scan done earlier on the opportunities in other commodities (mineral exports, gold, etc.) showed prospects, then this is the time to try and introduce some of these.

Apples would appear to provide somewhat better prospects than oranges because they can be stored for up to eleven months. Nevertheless, the size of orange exports makes it worthwhile to try and introduce contracts in both fruits during the start-up phase of the exchange. Game-changing benefits that the exchange can try to introduce are:

- Directly linking the exchange delivery locations to supermarkets in Bangladesh and India. By offering quality control and logistics services, the exchange may be able to entice these supermarkets to use the exchange as a procurement platform (demand in both countries is strong).
- A strengthened link with bank financing. As part of its core product offering, the exchange will already offer those who deposit produce into its warehouses the possibility to access bank finance at relatively attractive conditions. But this is only post-harvest, whereas currently, many farmers sell their apples and oranges pre-harvest. The exchange can work with a bank like BDBL to develop an alternative credit scheme, combining intelligence on the farmer's operations (data on his orchard, testimonials on past performance etc.) with control over the produce once it has been harvested (ie, sale through the exchange, with the receivables pledged to the reimbursement of the loan).

Cordyceps are now sold on eleven auction markets throughout the country. Bringing this trade together under one platform (and converting the auction markets into delivery locations) would permit buyers to become active nation-wide, without travel-related constraints. Furthermore, the exchange may be able to bring international buyers on board, bypassing middlemen. With this in mind, the exchange may want to consider offering buyers the possibility to take delivery of cordyceps outside of Bhutan.

D. Maturity

After some time, the exchange reaches a positive operational cash flow. Pressure from shareholders on exchange management will become less. Management will be able to invest in building the robustness of exchange operations (eg, by introducing more costly back-up systems to protect against disasters). The challenge in this phase is to maintain momentum. This may require changes in ownership, decision-making and salary structures.

Continued product innovation is necessary. By improving the conditions on the markets in which they operate, exchanges may make themselves superfluous or at the very least, have to reduce their fees to continue attracting users (for example, the value-added of the exchange's clearing functions - with the exchange guaranteeing the performance of each trade to both buyer and seller - will become less once buyers and sellers become more organized, credit performance becomes easier to check, and dispute settlement processes in physical trade improve).

Even in a small country like Bhutan, there are many opportunities for the exchange to come with innovative products in the future. In other countries, exchanges have proven valuable for supporting imports as well as distribution. For example, the warehouses approved by BCE can become the backbone for an efficient financing and distribution of fertilizer stocks. The exchange can also consider capital market instruments to improve commodity finance, for example by introducing a platform for invoice discounting (factoring), making post-harvest finance more competitive - Colombia's commodity exchange has positive experience with this.

Another successful experience from Colombia is that the exchange can offer a facility for registering contracts, at a small fee; with as a first benefit that it becomes easier to check the existing market engagements of commodity sector companies (due diligence becomes easier), and as a second benefit, that those registering their contract both agree to be governed by the exchange's rules on contract performance and conflict resolution (enabling out-of-court settlement of contractual conflicts). Furthermore, in the course of its business, the exchange will build up a strong registry of operators in the agricultural/commodity space, and such a registry can become the base of further business (eg., to register contract farming operations in order to reduce the risk of side-selling, or to provide the quantitative inputs for bank's credit risk scoring models).

Chapter 5

COST/BENEFITS OF A BHUTAN COMMODITY EXCHANGE

As discussed above, the proposed BCE would directly address significant bottlenecks in the marketing and financing of Bhutan's main crops. Among other things, having access to an exchange is therefore likely to lead to higher prices for farmers. In India, the Gujarat State Agriculture Marketing Board found that castor seed farmers who sold through a new electronic spot exchange realized prices that were 1.5% to 2.5% higher than the prevailing mandi (auction) prices; buyers also benefited, by 2%. This was in a well-organized state, considerably higher gains for farmers (4-5%) were found in states with poorer marketing infrastructure.⁴⁹ If one applies the Gujarati percentage just to the US\$ 13 million or so of potato sales that currently pass through the Bhutanese auctions, this translates to a gain for farmers of US\$ 195,000 to 325,000 a year – this alone would justify an investment of upward from US\$ 2 million into setting up an electronic commodity exchange, a number that is more than sufficient in the Bhutanese context. Comparatively speaking, a Bhutanese exchange would bring many more benefits to farmers than the Indian spot exchange did in Gujarat (for example, stock financing facilities), and over time it would offer a range of commodities, not just potatoes.

While a commodity exchange has many positive externalities that justify public support, eventually the exchange has to become financially viable. This implies that sufficient revenue has to be generated in order to maintain its operations. The main revenue will be from trading commissions, and will therefore be a direct function of the volumes that are traded through the exchange. This section sets out the likely costs, revenues, cash flows, investment needs and potential sources of funding of a Bhutan Commodity Exchange. The assumption here is of an independent exchange, but the analysis is not radically different if it is to be a department of the stock exchange – even in terms of capitalization (in excess of what is necessary to cover costs until break-even), a commodity exchange department would need its own capital allocation, in excess of that of the stock exchange operations.

A. Costs

Major expenses have to be made before the exchange even starts making any revenue, for the technical equipment in terms of soft- and hardware (for the warehouse management as well as the trading engine), and month-to-month expenditures on personnel, necessary training, and marketing.

BCE needs two main pieces of software to operate. One is the warehouse receipt system. This is used, inter alia, to establish the warehouse receipts, to permit the owners of the receipts to manage their positions, to register the pledging of receipts against loans, and to enable banks to manage their warehouse receipt-backed loans. The other system is the trading system, through which a warehouse receipt can be sold to the highest bidder; or can be offered for sale at a certain minimum price; or where a buyer can offer to buy receipts for certain crops at certain prices.

⁴⁹ According to the Government of India, *Economic Survey 2009-2010*, Chapter 8, Section 106: "So far, Maharashtra, Karnataka, Gujarat, Rajasthan, Orissa and Madhya Pradesh have given licenses to the spot exchanges to undertake electronic spot trading. The agricultural commodities traded on the spot exchange platform are cotton, castor seed, desi chana, guar seed, RM seed, wheat, barley, red arecanut, maize, yellow peas, urad, lemon tur, soyabean, jeera, groundnut, sugar, moong and pepper. In the process, Farmers' realization has increased by 4-5 per cent."

Surrounding this core system, one should have also a number of supporting software products, inter alia to provide an interface between the exchange systems and bank back-office software, or for the prices discovered on the trading system to be disseminated to a wide public. The costs of such systems is not prohibitive for Bhutan (it would have been just a few years ago, but these software costs have fallen much in recent years). On a fully commercial basis, a warehouse receipt system would cost less than US\$ 100,000, and a full-fledged trading system, able to support any contract that the exchange may wish to introduce in the foreseeable future, would cost in the range of US\$ 1-1.5 million (in both cases, vendors may well be willing to accept lower costs in return for a share of future exchange revenue). But in Bhutan's case, the costs may well be lower. FCBL is already developing a warehouse management system to which warehouse receipt modules possibly can be added at moderate cost. And RSEB, one of the prospective shareholders of BCE, has a full-fledged securities trading system with all the functionalities that one would need for a commodity exchange, and the vendor appears willing to add a commodity module at a low cost (US\$ 300,000 or less). It is assumed here that BCE will be able to acquire the two systems for US\$ 400,000, with another US\$ 200,000 spent on hardware. This US\$ 200,000 including investment in a back-up system (an offsite server and related back-up software and connectivity costs), the development of a mobile application for exchange trading (this would account for the larger share of the US\$ 200,000, but if the software has already been developed for use in another country, it may be available cheaply for Bhutan), and customisation/networking costs (the commodity exchange has to ensure that it is accessible from a wide range of access points, including all exchange-connected warehouses). It is well possible that building on existing relationships, software costs may be less, and with further negotiations with providers, the financial model should be adjusted accordingly. No further capital expenditures would be necessary in the first seven years of BCE's existence.

In summary, one can reasonably assume that an initial capital expenditure on hardware and software of US\$ 600,000 will be sufficient to meet BCE's requirements, with payments to be split between the first and second halves of 2016. BCE has made a project proposal to the Enhanced Integrated Framework (EIF), a multi-donor programme operated by the World Trade Organisation (WTO) which supports LDCs to be more active players in the global trading system by helping them tackle supply-side constraints to trade. This proposal has provisionally been approved, and it would cover half of these hardware and software costs (additionally, it will cover around US\$ 80,000 in operational expenditures). A delayed payment of this support (2016 instead of 2015) would not materially affect the economic viability of the exchange, but shareholders would have to carry the related cashflow burden.

The main operational costs will be staff-related. As soon as BCE is incorporated (assumed here to be in the course of June 2015, with BCE starting to function as of 1 July 2015), it needs to bring on board a Chief Executive Officer (CEO) as well as several staff to support strategy development and training (again, if it is decided BCE will operate as a department of the stock exchange, this will not be materially different: the new initiative still needs a dedicated, strong leadership that is not distracted by the burdens of operating the existing stock exchange business). Once the first hardware and software expenditures are being made, a Chief Operating Officer (COO) needs to be recruited, and a dedicated marketing staff. Table 4 below indicates the build-up of salary expenses during the first 1½ years of BCE operations. Salary numbers are based on those prevailing in Bhutan.

Table 4

Estimated salary expenses of BCE, first 3 half-years (US\$)

	half-year salary	Number of staff			Salary costs (US\$)		
		2015H2	2016H1	2016H2	2015H2	2016H1	2016H2
CEO	6000	1	1	1	6000	6000	6000
COO	5000		1	1	0	5000	5000
Marketing	4000		1	1	0	4000	4000
Research	3000	1	1	1	3000	3000	3000
Training	3000	1	1	1	3000	3000	3000
Support	2000	1	1	2	2000	2000	4000
Driver	1000	1	1	1	1000	1000	1000
Total:		15000	24000	26000			

It is advisable for the exchange to outsource non-core operational functions. In some cases, this can be on a straightforward pay-for-services basis (eg, administrative functions such as payroll management, record maintenance with respect to human resources, accounting; and management of the IT system), in others, it can be through profit sharing (eg, sharing trading fees with the exchange warehouse operators). At least in the initial years, it is assumed that BCE will outsource the above-mentioned tasks at a fee that starts at US\$ 500 per month.

The exchange also has to rely on national (and eventually Indian) experts (for legal issues, drafting the rules and regulations of the exchange, helping elaborate contract specifications, help develop and translate training materials) – expenditures are high in the set-up phase, but become a lot lower once the exchange starts trading. Marketing (road shows) will be important for the exchange, and this will require the acquisition of a car. From 2017, the year after all software has been installed, the exchange starts paying an annual maintenance charge. Common industry practice is that this is set at 20% of the software procurement cost, which as noted above is assumed here (for the warehouse receipt and trading software combined) to be US\$ 400,000.

In summary, one can reasonably assume the following operational costs (in US\$):

Table 5

Estimated operational costs of BCE in its first two years

	2015H2	2016H1	2016H2	2017H1
Senior staff (CEO & COO)	6000	11000	11000	11000
Support staff	9000	13000	15000	15000
Outsourced services	3000	3000	6000	6000
National experts	10000	10000	4000	2000
Travel & missions	4000	4000	4000	4000
Training & workshops	3000	9000	6000	3000
AMC on software	0	0	0	40000
Marketing	3000	6000	6000	3000
Premises	3000	3000	3000	3000
Car	15000	0	0	0
Sundries	4000	5000	5000	5000
Total	60000	64000	60000	92000

From the second half of 2017 onwards, it can be assumed that operational costs are kept under control. For purposes of financial planning an increase of 0.4% each month year is assumed, except for the annual maintenance charges on the software which are fixed at 1.67% of the procurement cost each month (ie, 20% a year).

B. Revenues

The major source of BCE revenue will be trading fees; hence revenues will be a direct function of contract turnover. The exchange will only start generating revenue once trade starts, and the aim should be that this is about a year after expenditures started. Given the experience in other exchanges, initial turnover is expected to start low, and with fluctuations around the trend will increase fairly rapidly only after 3 years of operations or so – once the “take-off point” has been reached, a doubling of volume from month to month, sustained for close to a year, would not be exceptional (but the assumptions used here are much more cautious). Whereas the exchange will have to increase its marketing efforts and introduce new contracts to sustain a continuous increase in volume, experiences from other exchanges have shown that thanks to contract innovation, a continuous increase in total volume over time, even after the market for the initial contracts has been saturated, is highly feasible. If an exchange does not fail in its initial years, given its highly scalable technology and systems, it is likely to become very profitable in the medium term.

To err on the side of caution, it is assumed here that the exchange just trades two commodities, potatoes and cardamom. It is furthermore assumed that production and export levels will stay at current levels (although under the Five Year Plan, the government targets a strong expansion); and that in a period of 6 years, the exchange can capture 90% of the volume of potatoes currently traded on Bhutan’s export auctions, as well as 50% of the current cardamom exports.

For potatoes, the exchange offers services that are superior to those of the auction yards, at a lower cost, so it can be expected that with the exception of low-quality potatoes and high-priced seed potatoes (for which the best prices can be established only when prospective buyers are able to physically inspect the produce), trade will indeed shift to the exchange. A 6-year period for that shift to take place assumes that many farmers feel a strong, non-economic attachment to the traditional auction mechanism (eg, as an excuse to visit a border town for a prolonged holiday) – the shift could possibly happen much faster.

In the case of cardamom, it is assumed that the current credit-driven system (under which farmers pre-sell their future cardamom harvest to traders) is quite resilient, and thus the exchange will only be able to capture half of the cardamom export volumes. A higher share may, however, well be feasible. Cardamom is well-suited for exchange trading. A very active cardamom contract (albeit for the small variety, not for the large cardamom that is produced in Bhutan, Nepal and the northerly parts of India) is traded on India’s MCX, and the experience in that case was that, after a relatively short initial awareness-creating period, those active in physical trading shifted en masse to the new exchange contract. The result was a much more efficient marketing system, with much better prices for farmers and much lower transaction costs, and a considerable strengthening of India’s position on the international market for cardamom. A Bhutanese cardamom contract would normally bring the same benefits, and should thus be embraced by farmers and traders alike – and if the Indian traders who are currently active in the market do not enable this shift, Indian traders with more experience in the exchange system can be expected to replace them (note that the main trading town for large cardamom from all three

major origins – Nepal, India’s state of Sikkim, and Bhutan – is Siliguri, only 150 km from Bhutan’s border town of Phuentsholing). Nevertheless, given the scarcity of finance for Bhutan’s agricultural sector, the pre-payment part of the current marketing arrangements may bring such benefits to Bhutan’s farmers that many do not wish to give it up. The warehouse receipt finance that forms part of the product offering of BCE only is available post-harvest, so it does not replace such pre-harvest finance. Nevertheless, the farm-level information created by the exchange should, after a few years, enable banks to start providing pre-harvest finance to selected farmers, reducing the dependency on financing provided by traders.

Exchange fees are assumed to be 3%, half of the normal auction fees, with 1.25% to be paid by the seller and 1.75% by the buyer (the existing auction yard fees include a discount for farmers who deliver early in the season, but for an exchange, it is advisable to charge a fixed fee). This leaves room for a further fee (1% has been suggested above) for the warehouse operator (for example FCBL), to provide an incentive for warehouse managers to do the work necessary to empower farmers to sell their produce through the exchange (and avail themselves of finance through the exchange’s warehouse receipt system).

It should be noted that these fees are for transactions that involve delivery into and out of an exchange-approved warehouse. It is advisable that the exchange also creates the possibility of trading warehouse receipts without taking delivery (ie, a buyer buys a receipt and resells it after some time); the fees for such trade can be put much lower, eg at 0.1% of the value of the commodities, to encourage active trade. Revenues from such trade are not included in the revenue projections used in this section.

In 2013, 26,346 tons of potatoes worth Nu 684.1 million (US\$ 11.2 million at the 2014 average official exchange rate as reported by the World Bank of 1 US\$ = Nu. 61.03) were traded through the FCBL auction yards. Another 5,300 tons were traded through the new private auction yard in Phuentsholing; assuming these had the same value per ton as the potatoes traded through the FCBL auction yard in that same town, they had a value of US\$ 2.4 million. Furthermore, US\$ 10.37 million of cardamom exports were reported. Assuming that the exchange can capture in seven years 90%, resp. 50% of these volumes, and charges a 3% fee, then the fee income for the exchange, in 2022, is US\$ 522,750, more than double its operational expenditures (while this may appear high, most international exchanges have in fact much higher profit margins).

It is assumed that when it first starts potato trading, the exchange only captures 15% of the potential revenue; growth after that follows an S-curve, with full potential only reached in the 6th year of trading; trade has grown to 20% of the potential after one year, 40% after two years, etc. All potato revenue is assumed to be from June to December of the year, taking into account the production season and typical price behavior on the Indian market (it does not make sense for Bhutanese producers to store potatoes until the Indian potato harvest has started). Cardamom revenue is throughout the year, and the growth pattern of revenue is assumed to be like that of potatoes.

There are other revenue sources, but these are not included in the estimates in this section. It may be noted, for example, that in Indian exchanges, after trading fees, the second largest source of revenue of the exchange is interest on the security deposits placed by those using the exchange. According to exchange regulations, brokers have to place security deposits, of which part has to be in cash on which they receive no interest. If BCE introduces similar rules, this will add to its bottom line,

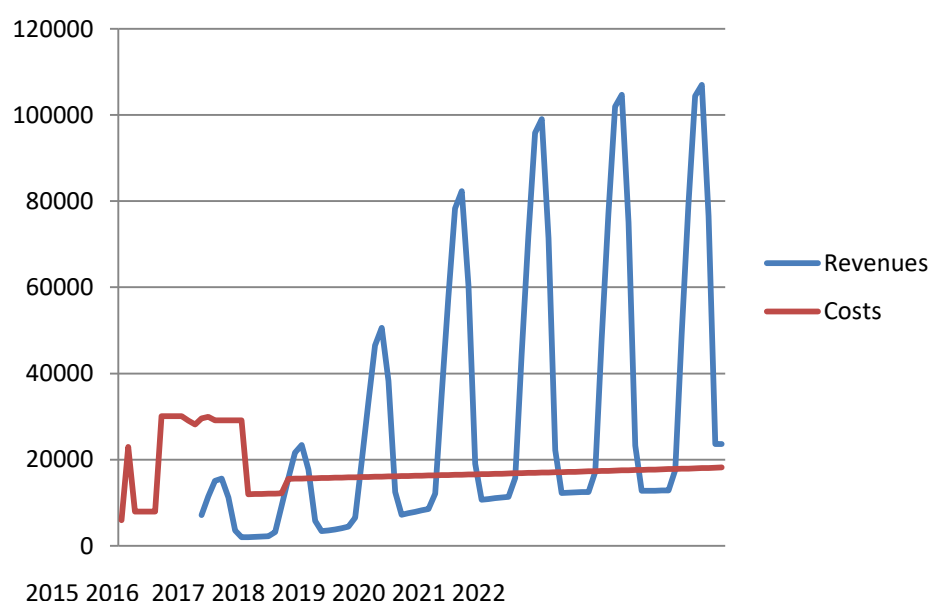
albeit only marginally so in its early years (it can be estimated at less than US\$ 2,000 in BCE's first year of trading). The exchange can also earn membership fees, penalties levied on users for non-respect of exchange rules, fees from banks for BCE's role in arranging warehouse receipt finance, and at some time in the future, fees from selling data. Finally, depending on how the investors in BCE decide to capitalize the exchange, BCE will have interest earnings on its positive cash balances.

C. Cash flow perspectives and cash flow risk management

Comparing the expected costs and revenue, as discussed above, gives the exchange's cash flow situation. Monthly revenue and cost projections are given in figure 4. This figure assumes the exchange is formally established on 1 July 2015, and trading starts on 1 July 2016. It also assumes that all potato trading takes place from June to December. Cardamom, on the other hand, can be easily stored, and it offers interesting market opportunities throughout the year, with prices typically increasing from July to September in the run-up to the main harvest, then falling, and then increasing again in the slack season from December to May. It is therefore assumed that cardamom will be traded on the exchange throughout the year.

Figure 4

Projected monthly revenues and operational expenses, 2015-2022 (US\$)



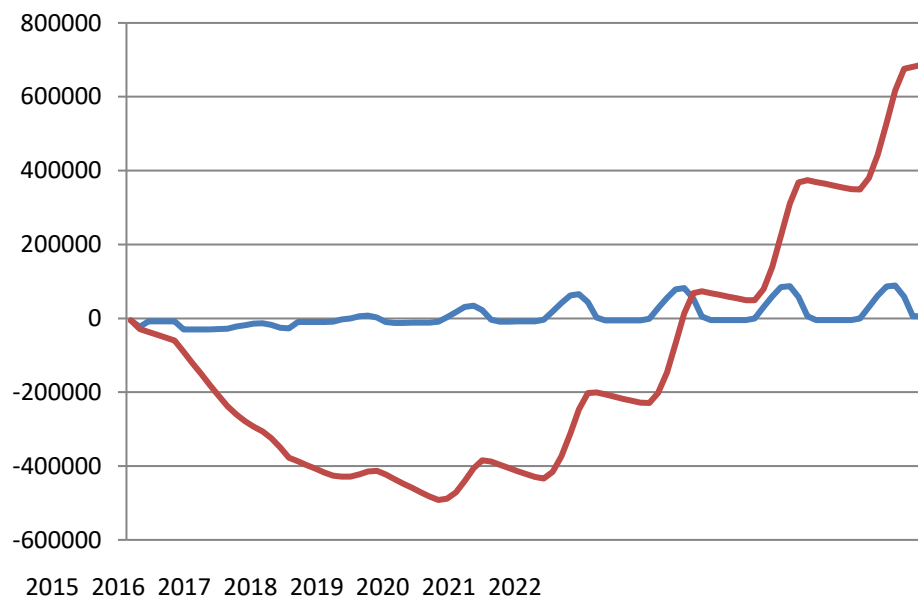
In the peak months of potato trade, revenues exceed operational expenses from the beginning. On a full-year basis, 2018 sees a cash-flow break surplus of some US\$ 50,000. Afterwards, each year revenues start considerably exceeding operational expenses. This is similar to the experience of the two main commodity exchanges in India, which both reached cash flow break even towards the end of their second year of trading.

When capital expenditures are included, the exchange sees its highest negative cumulative cash flow in the May 2018, of almost half a million US\$. The positive cash flows from June 2018 onwards lead to an improved picture in the following two years, but it is only in the second half of 2020 that the cumulative cash flow becomes positive (see Figure 5). By that time, the exchange has reached a healthy level of

profits, and if the shareholders so desire, the time is ripe to do an Initial Public Offering (IPO).

It is key for the exchange to manage the overall cash flow so that liquidity problems do not threaten its survival. The period until cash flow breakeven is thus critical, and investors have to ensure that from the outset, they commit sufficient funding to cover this period. The impact of not doing so – of the exchange will run out of cash to manage its operations properly – can be considerable. If exchange managers are forced to cut expenditures in order to avoid a cash flow crisis, the most likely cuts will be in areas like marketing or technology maintenance; both of these “false economies” could turn out to be very costly in the longer run. At the very least, it will slow down the time that the exchange reaches break-even (marketing is the key tool for attracting users to the exchange), and it may even lead to the exchange’s closure (because the owners can no longer support the cash outlays, or because earlier cuts, eg, in systems management, have led to a critical situation).

Figure 5
Cash flow and cumulative cash flow projection for BCE, 2015-2022 (US\$)



To reduce cash flow risk, apart from sufficiently capitalizing the exchange, it should be possible to get third party funding or other forms of support for some of the initial expenditures of the exchange, in particular for training.

D. Investment requirements

Funds (preferably equity, eventually complemented by bank credit lines) need to be available to cover the maximum likely negative cash flows (ie, in the scenario above, US\$ 492,000). But in addition, exchange users would normally expect the exchange to keep healthy cash balance, in particular as the exchange “interposes” itself between buyer and seller, guaranteeing performance of each trade to both of them. For this guarantee to be seen as serious there needs to be serious money in the exchange. Again assuming the above scenario, it would seem advisable for the exchange to have a start-up cash position (fully paid up by the first half of 2016) in the range of US\$ 800,000 to US\$ 1 million.

Some of the investors, notably RSEB and FCBL, can make a call on sweat equity, because of the contributions that they have made and will be making to the success of the venture. Furthermore, investors may wish to reserve part of the shares to provide an incentive package to exchange staff. How much sweat equity RSEB and FCBL are entitled to is a matter of discussion with other potential investors. **But just for illustration**, assume the decision is to bring in US\$ 1 million in cash; and that 65% of shares are fully paid, 30% are allocated as sweat equity, and a further 5% are reserved for the employee bonus scheme. This would indicate an initial equity capital of US\$ 1.54 million.

Under the assumptions used above, the exchange generates a positive cash flow (before taxes) of US\$ 300,820 in 2021. Globally, publicly quoted commodity exchanges tend to trade at 15-20 times profit before tax (and securities exchanges at 10-12 times), which suggests that initial investors who want to sell of their stake through an IPO in 2021 or later can reasonably expect a rather good return on their

investment. Assuming that the multiplier is 10 at the time of an IPO in early 2021, and the investors made their initial investment in early 2016, their rate of return (annual, compounded, and net of inflation) will have been 14% - and actually, higher, as interest earnings on the exchange's cash balances are not taken into account in these estimates (if interest earnings are taken into account, the annual rate of return would be closer to 20%).

Again, this is purely illustrative, meant to show that under realistic assumptions the exchange is an economically viable proposition, with a good chance to become profitable for its initial investors. Naturally, prospective investors have to make their own assessments on the various assumptions made in this chapter, and judge whether the project's benefits (including the benefits for the wider economy) are worth the risks.

E. Risks

There are no "hard" sources of information that can give a firm basis for the estimates and projections made in the previous sections. There is no direct precedence of an exchange in a small country like Bhutan, using very affordable yet high-powered software to introduce contracts in somewhat atypical products (for exchanges) like potatoes and cardamom. Thus, the return on investments is difficult to estimate with a high level of confidence, both because core software costs are still to be negotiated, and because benefits will rely on the speed with which stakeholders change their behaviour. Nevertheless, the assumptions here would appear rather conservative, and even with these conservative assumptions, projected returns exceed the minimums required to make investment in BCE worthwhile.

But an investment is not without risks. The following risks should be highlighted:

- Software costs for the trading engine. The normal price range for such software, of a quality required for a proper exchange and meeting Bhutan's requirements, is US\$ 1 – 1.5 million. The assumption made here is that this software can be acquired for US\$ 300,000. Indications are that this is indeed feasible (and in fact, that costs will be even less), by the addition of a commodities module to the trading system of RSEB. But until a contract has been signed, there is no certainty on this point. If the full commercial price is to be paid for an exchange trading engine (which also implies much higher annual maintenance charges) then a Bhutanese commodity exchange, at the current juncture and in a traditional format, is commercially non-viable.⁵⁰
- Delays in the start of trading, for any reason. Revenues from potato trading are critical for the exchange, and if the exchange for some reason is not ready to start trading around 1 July 2016, then the launch probably needs to be postponed to July 2017. Assuming costs continue to be made as

⁵⁰ Should it prove impossible to obtain trading software for US\$ 300,000 or less – a scenario that currently seems unlikely –, and investors are unwilling to accept the consequences of paying much more; or if investors are unwilling to invest even this amount for an unproven venture; then an alternative business approach would be that of a Lean Startup Approach, in which the exchange identifies a Minimum Viable Product (centered around the functionalities offered by an electronic warehouse receipt system) and moves ahead on this minimalist basis. A Minimum Viable Product is a product (business proposition) that has enough value for people to use it initially; that if successful demonstrates the likely future benefits of a scaled-up version; and that provides a feedback loop so that the exchange can work with early adapters to create and finance the scaled-up version.

anticipated but revenues are postponed by a year, the consequences for exchange cash flow are severe. The exchange's worst cumulative cash flow, for example, will be a negative balance of US\$ 722,000, and it will only be in 2023 that the exchange generates a positive return on equity for its original investors.

- Reductions in size of the underlying markets (for potatoes and cardamom). The exchange's trading fees are a percentage of the value of the produce traded. If potato and/or cardamom prices fall, and/or the volumes exported decline, then the exchange's revenues will fall below projections even if marketing objectives are achieved. Such occurrences can be the result, for example, of market developments in India, or of climate-change-induced declines in production in Bhutan.⁵¹
- Difficulties in recruiting key personnel. In terms of manpower, the exchange is a rather small operation, and the absence of key staff is likely to have a major impact on the roll-out of exchange operations.
- Difficulty in attracting sellers (farmers) to the exchange: limited volumes offered by farmers in distant locations through the electronic auction/exchange. This can be linked to several factors. One is insufficient awareness, for example because of insufficient exchange marketing. Another factor is skepticism about the added-value of the exchange compared to traditional trading mechanism (the potato auction yards, or the cardamom sale of future crops). Sound research by BCE to demonstrate the likely benefits of using the exchange and sound education of farmers is necessary to overcome this skepticism. Yet another potential risk is that of the link between farmers storing their goods in exchange-approved warehouses, and their access to affordable finance. BCE has to work closely with banks to ensure that they are ready to provide warehouse receipt finance in a manner that is convenient to the farmers. The new electronic auction system may not attract sufficient volumes because farmers may still prefer to sell to local traders because these traders would pre-finance/pre-purchase the crop ("buy the crop on the trees or in the ground"), as is already happening for cardamom, apples and oranges, with the practice expanding to some vegetables and other spices.
- Difficulty in attracting buyers, for example because they wish the exchange to fail. The exchange has to work closely with buyers/traders in the run-up to the launch of trading, and if necessary, reach out to traders who are currently not directly involved in Bhutan's agricultural export trade, but who should have an interest in starting business there.
- Difficulties in attracting non-trade-related participants (speculators). The experience in Nepal is that there is a large retail participation in unregulated commodity exchanges, mostly interested in products such as gold. BCE

⁵¹ Climate change is reported to be a big threat for cardamom production in Bhutan. "Across the eastern Himalayan region spanning India, Nepal and Bhutan, warmer and drier winters – conducive for [fungal blight attacks and viral] diseases – have been killing successive standing crops of large cardamom (*Amomum subulatum*) over the last decade forcing farmers to switch to less lucrative crops and severely impacting livelihoods and local economies." (Subhra Priyadarshini, "Himalayas losing prized spice to climate change, poor science", Nature India, 27 November 2014.

should also be able to attract such users – but this will require an active support of brokerage companies.

- Risks in warehousing. Trade on the exchange should be safe because every ton of potato or bag of cardamom that is traded should correspond to those amounts of commodities being stored in exchange-approved warehouses. But the weak link here are the warehouses. If goods disappear from these warehouses (or they were never deposited in the first place), BCE is liable – it needs to make good the exchange users who lose money for such a reason. FCBL, which will be managing most of the warehouses, appears to have a basic control system in place. But if warehouses are going to be used at a large scale as instruments for agricultural financing, FCBL's control systems needs further strengthening, and furthermore, the exchange needs to lay off most risks to the insurance sector. If risks stay with the exchange, then disappearance of goods from a warehouse could be very costly to the exchange.
- A likely absence of government oversight on the commodity exchange. This does not need to be an obstacle, but it poses a risk because all regulatory responsibilities are with the exchange. If exchange management fails to execute proper oversight over exchange operations or brokerage performance, there is no early warning from a government agency – a scandal can easily become so serious as to lead to the demise of the exchange. Thus, in this situation, the Board has to have a hands-on supervisory role, with active committees to oversee both the exchange and the brokers.

CONCLUSIONS AND NEXT STEPS

Two thirds of Bhutan's population are employed in agriculture, mostly as subsistence farmers. The agricultural sector needs to grow faster if poverty levels in the country are to be reduced. This is thus one of the priorities of the Royal Government of Bhutan. In the 11th Five Year Plan, it envisions a transition from subsistence to commercial agriculture; the building of a comprehensive marketing system to ensure commercial viability of agricultural products; and a strengthening of core institutional linkages towards the commercialization of agriculture.

Weaknesses in agricultural marketing and finance are thus identified as a critical bottleneck for the growth of Bhutanese agriculture. A Bhutanese commodity exchange, adapted to the realities of the country, can provide the backbone for the development of commercial, market-oriented agriculture, and can act as a new link between farmer and the financial sector. This has been recognized by the Royal Government of Bhutan, which in May 2014 participated in the set-up of the Commodity Exchange Committee to support work towards its establishment, chaired by the Royal Securities Exchange of Bhutan Ltd. (RSEB) and with members that include the Gross National Happiness Commission, the Royal Monetary Authority, the Department of Agricultural Marketing and Cooperatives/MoAF, the Food Corporation of Bhutan Ltd. (FCBL), two banks and other organizations.

A commodity exchange can be successful only if it offers significant new opportunities to market participants. This, in turn, will be the case only if it directly addresses key weaknesses in the existing arrangements and institutional infrastructure for agricultural production, trade and finance. In the Bhutanese context, the main weaknesses include fragmented production, inefficient marketing arrangements, and a lack of interest of most Bhutanese bank in financing farmers. A Bhutan Commodity Exchange (BCE) can tackle these challenges, by encapsulating the existing warehouses for agricultural produce in the country into an electronic commodity exchange network.

Bhutanese farmers do not have many marketing choices. For the domestic market, they mostly sell to traders at the farmgate, or to traders or consumers in illiquid weekly markets. For export markets, crops such as cardamom, apples and oranges are sold several months before the harvest to middlemen, at rather low prices; while for potatoes, many farmers take them to the auction yards at the border with India, a trip that costs most of them well over a week. In terms of transaction costs and the prices ultimately received by farmers, these are rather costly marketing options. Moreover, the sheer difficulty of marketing their produce discourages farmers from increasing their supply or diversifying into new crops. The proposed BCE would not remove farmers' current choices, but would rather add alternatives.

FCBL has warehouses across the country, and a few other organizations also operate warehouses. Under the proposed BCE model, these facilities (to the extent that they meet BCE's criteria) will be linked together into a warehouse receipt and exchange trading system. A farmer who delivers his goods into one of the warehouses receives – into his previously established online account – one or more warehouse receipts representing these goods. He can then chose whether he just keeps his produce in stock until he thinks the time is ripe for selling them (an option that is already offered in Paro for apples, by the National Post Harvest Centre, NPHC); or he can decide that he wishes to procure a loan against the collateral of his warehouse receipts (in this case, in the depository, the warehouse receipts are marked as “pledged” against the bank loan); or he can offer the warehouse receipt

for sale, to the highest bidder during the day, or at a target price that is higher than current market prices.

He can also combine a loan with a sales order – in that case, when after, say, a few weeks his target price is reached, the sale becomes effective, and the exchange deducts the loan payment and the storage charges before paying the net amount to the farmer. And it is also possible for the government to operate a minimum price scheme in combination with this mechanism; in this case, if the farmer cannot realize a price higher than the price guaranteed by the government, he can relinquish the warehouse receipts to the government's purchasing agent.

This system is possible only if certain conditions are met. In particular, buyers need to trust that a warehouse receipt indeed represents the goods indicated on the receipt, in terms of quality and quantity; and it has to be possible for them to receive the goods at their doorstep – or at least at a location that is convenient for them – so that they do not need to dispatch a truck to pick up potentially small volumes. The first requires use and acceptance of standard grades for the commodities traded on the exchange; and trust in the ability of BCE-approved warehouses to properly store and handle the commodities. The second requires the exchange to publish standard conditions (including transport fees) for the delivery of commodities from each of the warehouses that form part of the system to the main border towns, as well as to main consumption centres. Both are achievable: farmers and traders have a common understanding of what constitutes a grade for the commodities with which BCE would start⁵², and seem willing to accept Bhutan Agricultural and Food Regulatory Authority (BAFRA) certification of such; and FCBL, which is expected to be a shareholder of BCE, is ready to quote the relevant transport fees. It can be noted that (contrary to many other countries) legal and regulatory conditions in Bhutan seem to be already in place for an exchange to operate, and that the Royal Monetary Authority of Bhutan is supportive of the initiative – thus, there appear to be no legal or regulatory roadblocks.

Would the various stakeholders be interested in using the new options that BCE will offer? For FCBL, the proposed new roles fit entirely in its mandate; and in fact, its support to the BCE system will permit it to outsource many of its marketing responsibilities to the new entity. For the banks that are expected to provide finance against the warehouse receipt, BCE represents a new way to lend to farmers (an important corporate social responsibility objective) at low risk. For large buyers, it provides an efficient mechanism to procure commodities in bulk without relying on middlemen. For farmers, it is a way to market their produce in a way that would otherwise not be available to them; it reduces their transaction costs, and gives them certainty that they just have to deliver their produce to the nearest warehouse in order to have a ready market. For middlemen and traders, the situation is less clear. It will become much harder for them to make profits on the basis of asymmetrical information, or because farmers are forced to sell their crops to get ready cash, or to collude to influence market prices. On the other hand, they can use the exchange to procure more commodities more easily, and they can benefit from the warehouse receipt financing mechanism that will be part of the services offered by the exchange.

⁵² And farmers see the benefits. In the 2009 potato value chain study, “85% farmers said that the sorting and grading helps in fetching a better price”... and “during our field visit we noticed that either knowingly or unknowingly farmers were closely following the recommendations made [in terms of sorting by size] by the government authority.” (Joshi and Gurung, op. cit., 2009)

Developing a commodity exchange in Bhutan is certainly not without obstacles. However, one should be careful not to exaggerate these. There is no need to replicate the Chicago Mercantile Exchange, or even, India's Multi Commodity Exchange (which uses US\$ 1 million Stratus servers to link a network of some 350,000 trade work stations together). A Bhutanese exchange will be much less ambitious. And it is easy to argue that the conditions for an exchange in Bhutan are much better, thanks to developments in information and communications technology, than they were in Chicago in the mid-19th century when the first organized exchange was set up there. The road network in Bhutan is limited, but the warehouses of FCBL are all connected to roads that permit transport by 8-ton trucks rather reliably – if there is a landslide, it is normally cleared within 1-2 days, not enough to cause any damage to potatoes that may be transported for delivery under an exchange contract. There are enough warehouses of sufficient quality and capacity to support exchange operations. Mobile phones have become ubiquitous, and rapid, fixed-line internet connections are being rolled out across the country (including through the Farm Shops that are being planned for all 205 geogs). Already, 167 of the existing 185 Community Centers across the country are connected with high-speed broadband internet.

BCE needs two main pieces of software to operate. One is the warehouse receipt system. This is used, inter alia, to establish the warehouse receipts, to permit the owners of the receipts to manage their positions, to register the pledging of receipts against loans, and to enable banks to manage their warehouse receipt-backed loans. The other system is the trading system, through which a warehouse receipt can be sold to the highest bidder; or can be offered for sale at a certain minimum price; or where a buyer can offer to buy receipts for certain crops at certain prices. Surrounding this core system, one should have supporting software, inter alia to provide an interface between the exchange systems and bank back-office software, or for the prices discovered on the trading system to be disseminated to a wide public. The costs of such systems is not prohibitive for Bhutan (it would have been just a few years ago, but these software costs have fallen much in recent years). On a fully commercial basis, a warehouse receipt system would cost less than US\$ 100,000, and a full-fledged trading system, able to support any contract that the exchange may wish to introduce in the foreseeable future, would cost in the range of US\$ 1-1.5 million (in both cases, vendors may be willing to accept lower costs in return for a share of future exchange revenue). But in Bhutan's case, the costs may well be lower. FCBL is already developing a warehouse management system to which warehouse receipt modules could be added at moderate cost. And RSEB, one of the prospective shareholders of BCE, has a full-fledged securities trading system with all the functionalities that one would need for a commodity exchange, and the vendor appears willing to add a commodity module at a low cost (less than US\$ 300,000, which, for the sake of erring on the conservative side, is the value used in the financial modelling used for this section).

The return on investment is difficult to estimate, both because core software costs are still to be negotiated, and because benefits will rely on the speed with which stakeholders change their behaviour. Nevertheless, it would appear that even with very conservative assumptions they exceed the minimums required to make investment worthwhile, and to merit support from the government and the international community. The wider economic benefits include likely higher prices for farmers. In India, the Gujarat State Agriculture Marketing Board found that castor seed farmers who sold through a new electronic spot exchange realized prices that were 1.5% to 2.5% higher than the prevailing mandi (auction) prices; buyers also benefited, by 2%. This was in a well-organized state, considerably higher gains for farmers (4-5%) were found in states with poorer marketing infrastructure. If one

applies the Gujarati percentage just to the US\$ 13 million or so of potato sales that currently pass through the Bhutanese auctions, this would translate to a gain for farmers of US\$ 195,000 to 325,000 a year. Comparatively speaking, a Bhutanese exchange would offer many more benefits to farmers than the Indian spot exchange did in Gujarat (for example, stock financing facilities), and over time it would offer a range of commodities, not just potatoes. As to the profitability of BCE itself, these would be directly correlated with its trading volume. In the medium- to longer- term, one can expect a commodity exchange in a country like Bhutan to have a much higher volume than a securities exchange.

A commodity exchange in Bhutan, along the lines sketched above, would thus appear both desirable and feasible. However, it is a fact that market participants are used to the marketing system as currently exists in Bhutan, however imperfect, and the process to transform marketing practices and systems needs to be handled carefully. What would be the next steps?

The first step is the incorporation of the BCE. BCE's shareholders should be strategically chosen. FCBL probably should be the main shareholder, given that it is expected to make its warehousing facilities available (against a fee) to the exchange, and arrange transport from upcountry warehouses to the delivery points. RSEB will bring in the commodity trading system and know-how on managing organized electronic markets and, at least in the short-to-medium term, provide technology and marketing functions to BCE. A range of banks should be brought in to cement the position of BCE as a link between the agricultural and financial communities – even if some only take a minor, nominal stake, such shareholding will encourage banks to introduce warehouse receipt financing facilities, and to provide other facilities to exchange users. An institutional investor like the Royal Insurance Corporation of Bhutan Ltd. (RICBL) can anchor the venture, and help provide it with necessary working capital until the exchange reaches break-even.

The exchange needs premises, computer hardware (preferably including a disaster recovery system), and staff. Core staff and functions have to be within BCE itself. Certain services would best be outsourced; for example, BCE should not become the owner of warehouses or trucks but instead pay others, in the short run FCBL in particular, for warehousing and transport services. The core management team has to include a CEO to provide overall oversight and to liaise with external stakeholders and the government; and a COO to provide day-to-day management of all operations. Other core staff include a head of marketing (responsible for outreach to and training of prospective users), and a head of strategy/research. Functions such as human resources management, procurement, IT, administration and financial management can be outsourced in the short term.

The new entity would have to be given a license to operate a commodity exchange, or operate under a special government decree. Not every company should be allowed to start exchange operations: there are too many things that can go wrong, and too much of a potential impact of improperly managed operations on producers, exchange users and society as a whole. A commodity exchange has to abide by certain criteria and conditions in order to be given a license, and then to keep it. These criteria inter alia include financial soundness, honest management, independence from any group of market users (ie, the trading platform and the way it is operated has to be unbiased), and transparency. These conditions are very similar to those under which a stock exchange operates, and under Bhutanese conditions, it would make sense to have the same authority that licenses RSEB and oversees its performance – i.e., the Royal Monetary Authority (RMA) – as responsible for licensing and overseeing BCE, under the same Financial Services Act.

The exchange then needs to assure that the necessary software is developed and tested, and that its systems are accessible to prospective users. This means that all warehouses have to be linked up, through a well-functioning (internet) connection (leased lines become a possibility after volumes have increased); and that a new brokerage community is developed to act as intermediary between the final users of the exchange (the exchange cannot handle a few tens of thousands of farmers directly), and to support/advice these final users. This new community of brokers can be recruited from different groups, including the current securities brokers (who can, for example, form the link with organized buyers in Bhutan, such as processors, schools, hospitals or the army), from agents associated with other marketing initiatives (such as the FCBL's Farm Shops programme), from those who are currently operating as middlemen between farmers and traders, and even from among progressive farmers. It is also highly desirable to develop a mobile application that permits end-users (such as farmers) to directly trade on the exchange (the farmers' brokers would set the limits up to which they could trade).

The exchange has to develop by-laws, rules and regulations, and mechanisms through which to implement these. For example, it can set up an arbitration panel to deal with potential disagreements in the delivery process (such as when the produce delivered does not reflect the quality indicated in the quality certificate which is attached to the warehouse receipt). The by-laws, etc., can be based on those used by existing exchanges in other countries, such as India.

Contracts and delivery specifications then have to be developed. It would be good to start with at least two contracts (potatoes and cardamom appear the most suitable), and if possible, one or two more (apples and ginger may be good prospects). The key criteria for choosing a commodity (at least in the short run, once the exchange has firmly established its network more complex contracts become possible) is that its delivery mechanism can be made to work. Contract development requires meetings with representative stakeholders to achieve a buy-in of the proposed contract specifications. It also requires in-depth market research to inform the development of awareness-raising and training materials, and to be able to plan a road show and training programme for prospective users.

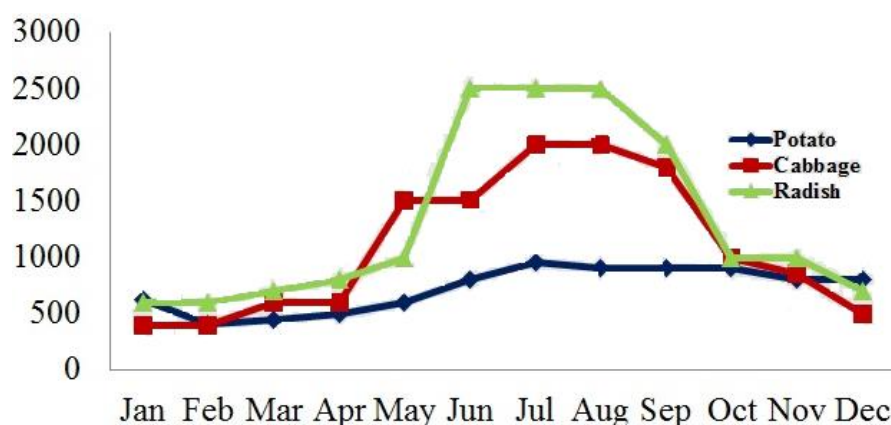
Through meetings with banks, BCE should ensure that at the time of product launch there is at least one bank willing to provide short-term loans against warehouse receipts, at attractive rates (which should be lower than the current rates for group-lending as currently charged by the Bhutan Development Bank Ltd., as risks and transaction costs are lower).

When the new, electronic exchange operations are introduced – the start of the 2016 potato campaign, in June/July, may be set as the target – the electronic system will function alongside the existing auction system. One cannot expect farmers and traders to shift immediately to a new system; rather, they will have to be given time to develop trust in the new system. BCE should consider a push-and-pull approach. Farmers should be pulled into the new electronic system through the new facilities – not available through the auction – that this system will offer: the opportunity to sell from an upcountry warehouse not just to exporters but also to organized local buyers (eg. processors), and obtaining a loan against physical stocks. Farmers should also be pushed to improve the way that they operate on the auction – for example, the existing rule that all potato auctions have to be for at least ten bags (500 kg) should be enforced, and farmers should be rewarded for delivering quality-sorted potatoes rather than mixed lots (for example by giving them priority at the auction – now, farmers' trucks sometimes have to wait for a week at the auction gate, due to a glut

in supply). Farmers who thus improve their auctioning practices will find it easy, in time, to shift to sale through the electronic platform.

Auctions will continue for differentiated commodities, for which buyers have to be able to see and inspect the lot in order to determine its value, such as selected fresh fruits and vegetables. Indian demand for Bhutanese produce will remain strong, and it is likely that there will be enough business for the auction yards to survive even if potato business goes elsewhere. In fact, it may be beneficial in the long run for the auction to be forced to focus on differentiated commodities. The Bhutanese auction yards are quite small (the main one, in Phuentsholing, is reported to be able to process only 25 truck loads a day) and if this capacity is fully used for vegetables other than potatoes potential gains for Bhutanese farmers could be substantial. This is illustrated by the prices in figure 6 below: while potatoes show a significant price increase in the Indian off-season, the price increase for cabbage and radish is much stronger.

Figure 6
Potato, cabbage and radish prices in Indian Rupee/quintal in Guwahati, Assam, India, 2013



Source: SNV, "Vegetable Value Chain Programme & Linking to Schools", <http://www.snvworld.org/node/4269>

For Bhutanese farmers, participating in the existing physical auctions is expensive, not so much because of the auction fees, but due to the costs of travelling to and lodging in the auction town. So ultimately, the auctioning of fungible commodities (storable commodities of which the quality can be readily represented through a quality certificate) is likely to disappear.

It is cheap and easy to add contracts on an established electronic platform (research and marketing constitute the main cost). In the longer term, one can thus expect BCE to trade a varied set of assets. These can include non-farm commodities (e.g., some of the minerals that the country now exports, or gold for the consumer/investment markets), and even more complex "project bond"-type instruments that would be used to finance value chains from producer to processor. Other possibilities include invoice discounting, instruments to facilitate imports, and risk management instruments (for any asset class that has a reliable index). So, while the BCE is expected to achieve sustainability on the basis of trade in Bhutan's main commodities, one can expect it to evolve in time to continue serving the needs of Bhutan's evolving economy.

Annex 1
Terms of Reference –
ST Consultant for Commodity Exchange Development in Bhutan

Background

As part of the Royal Government of Bhutan's efforts to accelerate growth in the agricultural sector, the Royal Security Exchange of Bhutan (RSEB) has been entrusted to establish an agricultural commodity exchange market in Bhutan. The project's working committee comprises members of the Food Corporation of Bhutan (FCB), the Gross National Happiness Commission (GNHC), RSEB as well as other national stakeholders.

In order to ensure the successful implementation of the project, an experienced consultant is needed providing the technical expertise to RSEB in framing the blueprint for infrastructure, trading systems, and operations. Building on the existing research by RSEB a customized solution has to be tailored to the Bhutanese scenario that takes domestically constraining factors such as the lack of a uniform system to process commodities after harvest, the weak rural road network and the low financial literacy among farmers into account. Recommendations have to cover relevant technical, operational, financial and legal aspects.

As the duration of the mission is limited the consultant is expected to obtain a basic understanding for the prevailing situation prior to the assignment. This includes (i) the agricultural sector in Bhutan, (ii) the marketing, storage and trading system for commodities in Bhutan, focusing on the export oriented commodities (e.g. potatoes, apples, oranges, vegetables), as well as the public and private sector institutions involved, and (iii) the background and latest status of the project to establish the Commodities Exchange. RSEB and the World Bank will provide any relevant material to the consultant at the very start of this assignment. The consultant will be available before his visit to Bhutan in March to provide needed guidance on the ongoing work of RSEB in moving ahead with establishing the Commodities Exchange.

The consultant will report to Sabin Shrestha and Panos Varangis. He will work in close cooperation with RSEB and he will discuss and engage with all relevant national stakeholders during his stay in Bhutan.

Main responsibilities for the assignment:

I. ***Development of the blue print for the new Commodities Exchange system***

The consultant, will assist RSEB in the development of the blueprint of the desired market ecosystem (e.g. the linkage between warehouses and the trading platform) and the design of an efficient post-harvest infrastructure. This includes: specification of roles & responsibilities for commodity marketing from farm gate to trade on the new commodity exchange based on proposed operational structure and cluster map of existing facilities; initial focus is on potato marketing for launch of operations. In addition to potatoes the consultant is expected to identify additional commodities that can be traded at the new exchange

II. ***Assessment of the features of the warehouse management system currently implemented by Food Corporation of Bhutan (FCB).***

The consultant will provide guidance to RSEB to identify the key elements

and assist in the design the standard operating procedures (SOPs) for collection centers/ warehouse management, i.e. warehouses/ depots/ godowns by FCB and other facilities operated by Department of Agricultural Marketing & Cooperatives (DAMC). In addition, the consultant will assist RSEB to specify a broad road map for introducing a warehouse receipt system that banks can use to finance stored commodities so farmers do not have to sell immediately after the harvest. Furthermore, the consultant will provide suggestions on the coordination of underlying mechanisms and examine the integration into the new warehouse management system currently installed by FCB.

III. *Definition of nature and scope of the Exchange*

The consultant is expected to:

- Determine the modus operandi of the new Exchange; provide recommendations on how to efficiently build one central spot exchange that integrates online trade, with the existing open outcry in the multiple auction yards operated by FCB.
- Advise on necessary and relevant ICT for exchange enabling better outreach to smallholder farmers
- Advise on the legal structure, regulation, contracts and bye-laws for the exchange
- Advise on risk management and dispute settlement mechanisms
- Advise on the SOP for the exchange
- Develop a detailed budget plan

IV. *Assessment of the Financial viability of the Exchange*

A commodities exchange has costs (establishment and running costs) and charges fees to cover its expenses. Fees are usually at levels as to attract business and cover costs. An analysis should be made to show the financial sustainability of this exchange by developing scenarios which show potential/projected volumes building over time, and a structure and levels of fees, as well as assumptions about costs. Since the exchange will be the integrated system of warehouses in production areas, delivery mechanisms (transportation) with the electronic platform, there will need to be scenarios to assess potential costs of such a new system. The current system is very simple as only deals with physical auctions at the delivery point---the goods are already at the border. The consultant is expected in collaboration with RSEB and FCB to develop scenarios related to projected volumes of trade, early estimates of costs for running the new exchange and proposed fees that the exchange could be charging to show the financial viability of the exchange. Within this analysis, the consultant is expected to identify the key conditions/pre-conditions to make the exchange financially viable (also identify main risks). As a background, it will be good to assess the current costs and revenues of the existing system of FCB conducting physical auctions in its three auction yards.

V. *Review of existing offer for an automated system for trading, and clearing & settlement*

The consultant will provide advice on “tailored solution” for Bhutan given international best practices and alternative options to proposed system. In other words, the consultant should identify the key specifications or features that an electronic trading platform would need to have to serve the needs of the proposed Exchange in Bhutan and how this electronic trading platform would interface with a warehouse management IT system, like the one

operating by FCB (and what upgrades would such an existing IT system would need)

VI. *Review and suggestions for the refinement of current product quality standards (to suit on line trading)*

The consultant will review the adequacy of the current system of commodity quality grading standards by Bhutan Agriculture and Food Regulatory Authority (BAFRA) and its suitability for on line trading (e.g. are existing grading and quality standard adequate to conduct on line trading for such commodities?); initial focus is set on potatoes while the consultant is expected also to make few suggestions regarding other commodities (e.g. apples, vegetables, etc).

Output

The consultant is expected to provide a detailed report on findings and recommendations for the next steps in establishing the commodities exchange in Bhutan. These recommendations would provide a detailed road map based on which RSEB, FCB and other key stakeholders would use to implement the project. In addition, the consultant is expected to present in a report the results of the financial viability assessment of the proposed exchange, identifying the key parameters for making this exchange financially viable and key threats that could undermine its financial viability.

Annex 2

Operating an exchange-approved public warehouse: operational implications

A public warehouse is a warehouse operated by a warehouseman, who stores commodities for unrelated third parties for a set fee. He may also provide other services, such as packing, or container loading. In the case of the proposed BCE, warehousemen will be companies like FCBL. BCE will accredit the FCBL as a warehouseman (an exchange-approved warehouse operator), and will negotiate which fees FCBL will charge for its various services (grading goods, establishing the electronic receipts, storage per day, re-bagging, loading etc.). FCBL will advertise these fees for all to see.

The warehouseman does not obtain title to the commodities he stores, but instead, he becomes the custodian of the commodities. This implies that the warehouse operator retains possession of the commodities. From a bank's perspective, this makes it much easier to provide finance against the collateral of these commodities, as in many legal regimes, it gives him automatic priority over other creditors in the case of a default by the borrower.⁵³ Thus, a public warehouse can act as a convenient financing vehicle for a bank. And vice versa, the ability to arrange for access to bank finance can be a good way to attract depositors to a public warehouse.

This annex discusses the process through which a public warehouse operator can turn commodities such as potatoes deposited by third parties into good delivery instruments for BCE, and sound collateral for banks. The situation discussed is that of a depositor who wishes to use his goods as collateral for a loan; and a warehouse operator who has an agency agreement with one or more banks under which he can initiate the loan request for an interested depositor. It assumes that the legal system enables the operations as described – this appears indeed to be the case. Also, it assumes that the warehouse operator, rather than relying on paper warehouse receipts, is linked to an electronic warehouse receipt system.

The basic components are as follows:

1. The warehouse operator has to meet the criteria set by BCE for accreditation as an exchange-approved warehouse. These criteria will be operational (quality of the warehouses, procedures and staff; ability of the operator to provide BCE with required information; readiness of the warehouse operator to have sufficiently well trained staff at all proposed delivery sites) as well as financial (the ability of the warehouse operator to stand behind its guarantees, and in particular, the guarantee implicit in each warehouse receipt that the goods indicated in the receipt indeed exist).
2. The warehouse operator has to be an acceptable credit risk for the bank.
3. The operator has the capacity to provide the information that the bank requires – including through connectivity to the internet.
4. The operator has proper procedures in place to deal with warehouse receipt finance.

⁵³ This is called “bailment”. For bailment to exist, the depositor, while retaining ownership, must relinquish possession of the commodities and the warehouseman must assume exclusive, continuous and “notorious” possession of them. “Notorious” means that the presence and control of the warehouse operator has to be clearly signposted on the warehouse, and individual lots marked as pledged to banks. If bailment cannot be proved, the holder of a warehouse receipt has no priority over other creditors in the case of a default. In a public warehousing arrangement, bailment can be easily proved.

The warehouse operator becomes legally liable for the goods he stores. If these goods are stolen, damaged or destroyed through any fault of his, he and/or his insurance companies have to make up for the value lost. Insurance also has to be in place for catastrophic events (fire, water or storm damage, etc.) (FCBL has this insurance coverage). The bank thus will need to feel it is able to rely on the operator. In the specific case of Bhutan, it is advisable that banks can rely on BCE's due diligence report, which implies that BCE should ensure that it is able to provide a report which contains all the information that banks require. This normally includes the following aspects:

- The warehouse operator's legal status – does he have all the required licenses and permits to undertake public warehousing operations?
- His reputation in the market
- His overall business operations: to what extent is the operator committed to the business of providing professional warehousing services? Note that for a company like FCBL, this is not yet a core part of its business, so the commitment of FCBL to this new activity has to be made explicit. The due diligence report should in particular note whether the operator holds goods for his own account in the warehouse, and how these goods will be kept separate from those held on behalf of third parties.
- His financial situation
- The physical state of the warehouse facilities proposed for the warehouse receipt system (eg, are the buildings well-kept and are the surroundings neat, without uncontrolled vegetation against the outer walls? are there no infiltration points for water, or for rodents; are the floor markings clear?). Do they have the required equipment (weighbridge, moisture meters, temperature and humidity controls, burglar and fire alarms, sprinkler system, internet connectivity etc.)
- The warehouse operator's process control: is his staff well-trained? Can the operator ensure that his staff follows all applicable procedures? Is access to the warehouse and its keys properly restricted?
- The operator's insurance coverage.

In setting out operational procedures for an exchange-approved warehouse, BCE and the warehouse operator have to ensure that the operator is able to provide the information that the bank requires, at the speed that the bank requires (which nowadays requires an Internet connection). As the bank's loan disbursements depend on the value of the goods in the warehouse, this will include reliable information on the specific quality of the commodities that have been deposited by a borrower. The operator thus needs to have both the staff and the equipment to accurately grade the commodities, or it needs to work closely with a company like BAFRA that is able to provide these services. BCE should consider putting a price information system in place that permits banks to receive market prices for the various grades.

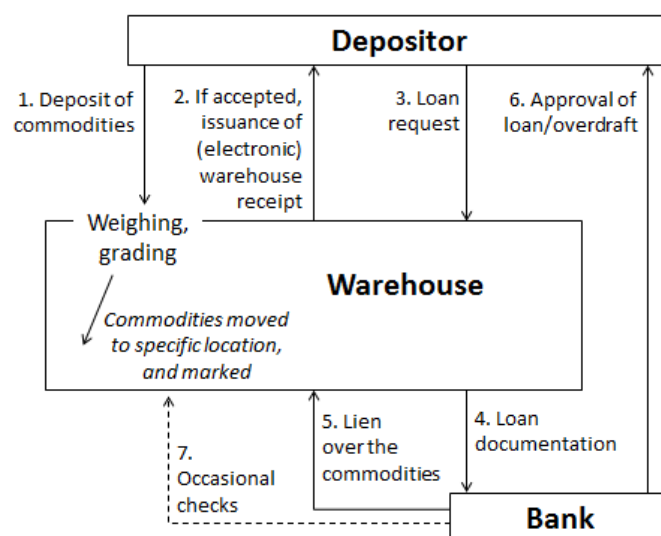
The procedures of the warehouse operator are critical. They will ensure that indeed, the operator takes best possible care of the goods in his custody; that the exchange delivery processes work well; that the bank obtains the information that it needs; that the bank's lien over goods pledged as collateral for a loan is maintained safely; and that, in case of problems, the insurance company will not be able to dispute its obligation to cover the loss.

When a depositor brings commodities to the warehouse, the operator will first test them to ensure it meets quality standards. If they does not (eg, the percentage of rotten produce is too high), the goods should be refused entry into the warehouse. For storage in bags, only bags that meet minimum set standards can be accepted; but the operator may offer the depositor re-bagging services, at a fee. The same principle applies for storage in crates.

On arrival at the warehouse, the goods are counted, with the warehouse operator producing a tally sheet (an often hand-written count on a pre-printed form of the number of bags or crates received by the warehouse operator's staff), a weigh note (which can be a print-out from an electronic weighbridge) and (generally) a quality certificate. A copy of each is given to the depositor (or eventually, the depositor's transporter if the depositor did not come himself), together with a Goods Received Note specifying quality and quantity; the originals need to be properly filed.⁵⁴ On the basis of the information in the tally sheet, weigh note and quality certificate, the operator will issue a warehouse receipt in electronic format, electronically signed by a person authorized to act for the operator (not the same person who issued the tally sheet and weigh note). The receipt will include information on the depositor, the quality and quantity of goods deposited, the maturity of the warehouse receipt, and the various costs and fees. Traditionally, the warehouse receipt is a document printed on banknote-quality paper, with a unique number; this is to reduce the risk of forgery. But nowadays, the creation of the receipt in an electronic system is preferable, for reasons of both efficiency and security.

The depositor can be offered the possibility of using his warehouse receipt as collateral for a loan, and/or to offer the receipt for sale at the exchange. The bank(s) interested in providing warehouse receipt finance can advertise their conditions (tenors, interest rate and fees, percentage of the value of the commodities to be financed), while the day's market prices can be advertised by the warehouseman. The warehouseman can help the depositor fill out the loan form, which will be submitted electronically. The bank can then put a lien on the receipt (meaning that the goods cannot be sold without the bank's permission), and simultaneously provide a loan to the depositor. The bank has to be able to link the warehouse receipt with actual physical goods, and even on a surprise visit, has to be able to inspect these goods (which should be signposted as pledged to the bank) for concordance with the operator's statements (public warehousing in silos, where commodities of various depositors are mixed, is therefore riskier, and requires additional procedures).

Figure A.1
Schematics of the use of warehouse receipts issued by a public warehouse for obtaining a loan



Source: Authors

⁵⁴ While the Goods Received Notes and the tally sheets are just a record of the goods received by the warehouse operator, they can provide valuable back-up in case of, say, a warehouse fire, strengthening the likelihood of a successful claim to the insurance company.

The warehouseman has to keep the deposits of each depositor separate, and clearly marked. The warehouse records should show the location of the goods represented by each receipt. Goods should be checked regularly for concordance with the information on the warehouse receipt, by an employee who had no role in first receiving the goods when they were deposited at the warehouse, and no responsibility for the day-to-day storage operations. This information should be conveyed to the depositor, who should be encouraged to query eventual discrepancies.

As long as the goods are in the warehouse, the operator has an obligation to take best possible care of them. One part of this is proper security procedures, e.g., the continuous presence of security guards (a modern warehousing company may equip their security guards with global positioning devices to check that they indeed make regular rounds of the premises), and strict checks on all vehicles entering and leaving the premises (a record should be kept of license plates and driver identification details). It also includes regular fumigation if this is required to keep the produce in the best possible condition – the warehouse should establish a schedule. There is also an obligation on the operator to ensure that commodities do not get infected or polluted because they are stored together with unsuitable other goods (so, food crops should never be stored together with fertilizers, chemicals, cement and the like).

The borrower can either repay the loan, and then is given full control over the warehouse receipt again; or he can sell the commodities to a third party (through the exchange or otherwise), with payment made through an approved bank account. In the latter case, the bank then deducts from this amount the sum due under the loan, may directly pay the fees of the warehouse operator, and releases the remainder to the depositor. The warehouse receipt will be transferred to the buyer, who can now take delivery of the goods (after paying any storage charges that may be incurred from the moment of receiving the warehouse receipt to that of taking delivery of the goods). It is good practice to count the number of bags delivered twice: one time on release from the storage room by the store clerk; and one time on loading into the truck(s) or boat by the shipping clerk.

In case the borrower defaults, the bank's lien on the paddy/rice means that he should be able to sell the goods at once, without having to wait for a long court process to auction off the products.⁵⁵ After the sale, he can instruct the warehouse operator to deliver the goods to the buyer. If it turns out that the commodities are no longer in the warehouse, or are not of the quality stated in the warehouse receipts, then the bank has a claim on the warehouse operator and his insurance company. In the case of a delivery through the exchange, as the exchange guarantees the performance of each contract the exchange first has to make good the buyer for any losses that he may have made because of the failure of the delivery; the exchange will then turn around and claim compensation from the warehouse operator.

⁵⁵ The bank should however note that the warehouse operator has a first lien on the goods stored, against the payment of his storage fees, and therefore in case of a default or bankruptcy of its borrower, the bank should make sure that the warehouse fees are paid – otherwise, the warehouse operator has the right to sell the goods.