

MYANMAR:

RICE PRICE VOLATILITY AND POVERTY REDUCTION

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RICE PRICE VOLATILITY AND POVERTY REDUCTION



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Acronyms and Abbreviations

ADB	Asian Development Bank
ADF	Augmented Dickey-Fuller test
ASEAN	Association of Southeast Asian Nations
CPI	Consumer price index
CSO	Central Statistical Office of Myanmar
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FAS	Foreign Agricultural Service (of the USDA)
FOB	Free on board
GDP	Gross domestic product
GIEWS	Global Information and Early Warning System on Food Security
Ha	Hectare
IMF	International Monetary Fund
LCU	Local currency unit
MIS	Market Information System
MOAI	Ministry of Agriculture and Irrigation
MOC	Ministry of Commerce
MWK	Manawthukha
OLS	Ordinary least squares
PT	Price transmission
Ton	Metric ton
Government	Government of the Republic of the Union of Myanmar
USDA	United States Department of Agriculture
VAR	Vector autoregressive model
VECM	Vector error correction model
\$	United States dollar

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အစီရင်ခံစာ အနှစ်ချုပ်

မြန်မာနိုင်ငံ၏ဆင်းရဲနွမ်းပါးမှုလျော့ချရေးအတွက် ဆန်၊ စပါးဈေးနှုန်း မတည်ငြိမ်ခြင်းဆိုင်ရာအရေးကိစ္စများ

မြန်မာနိုင်ငံသည်ဆင်းရဲနွမ်းပါးမှုနှုန်းမြင့်မား၍ ဝင်ငွေနည်းပါးသည့်စိုက်ပျိုးရေးနိုင်ငံဖြစ်ပါသည်။ ဆင်းရဲနွမ်းပါးသည့်ပြည်သူအများစု၏အသက်မွေးဝမ်းကျောင်းလုပ်ငန်းဖြစ်သည့်စိုက်ပျိုးရေးလုပ်ငန်းမှာအဓိကဖြစ်၍ အထူးသဖြင့်ဆန်စပါးကဏ္ဍပေါ်တွင်များစွာတည်မှီနေပါသည်။ ဆန်စပါးသည်မြန်မာနိုင်ငံ၏စုစုပေါင်းစိုက်ပျိုးမြေများ၏ ၇၀% နှင့်နိုင်ငံ၏စိုက်ပျိုးရေးကုန်ထုတ်လုပ်မှုတန်ဖိုး၏ ၃၀% ထိပါဝင်ပါသည်။ ဆန်၊ စပါးထုတ်လုပ်မှု၏အကျိုးဖြစ်ထွန်းမှုတိုးပွားလာခြင်းသည်ကာလတိုကာလလယ်နှင့်လယ်ယာလုပ်ငန်းလုပ်ခ(အခကြေးငွေ)များနှင့်ဝင်ငွေများတိုးလာစေရန်အဓိကအရေးပါသည့်အချက်များဖြစ်ပါသည်။ ထို့အပြင်ဆန်၊ စပါးထုတ်လုပ်မှုမြင့်မားလာခြင်းအားဖြင့် သက်သာသောအစားအစာဈေးနှုန်းထိန်းထားနိုင်ခြင်းစားနပ်ရိက္ခာဖူလုံခြင်းနှင့်ဆင်းရဲနွမ်းပါးမှုလျော့ချနိုင်ခြင်းစသည့်အကျိုးကျေးဇူးများရရှိမည်ဖြစ်ပါသည်။ အဘယ်ကြောင့်ဆိုသော်အိမ်ထောင်စုများ၏ပျမ်းမျှဝင်ငွေစုစုပေါင်း၏ ၆၁% ကို အစားအစာအတွက်သုံးစွဲနေရပြီး ဆန်သည် အစားအသောက်ကုန်ကျမှု၏ အဓိကအစိတ်အပိုင်းဖြစ်သောကြောင့် ဖြစ်ပါသည်။

စိုက်ပျိုးရေးဈေးကွက်များတွင် ဈေးနှုန်းအတက်အကျရှိခြင်းသည် ပုံမှန်လက္ခဏာ ရပ်တစ်ခုဖြစ်ပါသည်။ ရာသီဥတုအခြေအနေ၊ ပိုးမွှားနှင့်ရောဂါများ၊ ကာလတိအတွင်း ဝယ်လိုအားနှင့် ရောင်းလိုအားအပြောင်းအလဲမရှိခြင်းတို့ကြောင့် စိုက်ပျိုးရေးထွက်ကုန်များသည် ကာလတစ်ခုနှင့် တစ်ခုအကြား အပြောင်းအလဲရပြီး စိုက်ပျိုးရေး ဈေးကွက်များတွင် ဈေးနှုန်းအတက်အကျကိုဖြစ်ပေါ်စေပါသည်။ ထို့ပြင် ရာသီနှင့် ဒေသအလိုက် ဈေးနှုန်းပမာဏ အနည်းငယ် အပြောင်းအလဲများကို ခံနိုင်ရည်ရှိရပါမည်။ အဘယ်ကြောင့်ဆိုသော် အဆိုပါဈေးနှုန်းအပြောင်းအလဲများသည် ဈေးကွက်အတွင်းထွက်ကုန်ရှားပါးမှုကို သိရှိစေနိုင်ပြီး ဈေးကွက်ဖြည့်ဆည်းမှုကို ချောမွေ့စေနိုင်ခြင်း၊ ပိုလျှံသည့် ဒေသနှင့် ရှားပါးမှုရှိသည့်ဒေသများအကြား အရောင်းအဝယ်အကျိုးအမြတ်ကို မြှင့်တင်ပေးနိုင်ခြင်း၊ ရိတ်သိမ်းလွန်ကာလ စီမံခန့်ခွဲခြင်း၊ သိုလှောင်ခြင်းနှင့် ကုန်သွယ်ခြင်းဆိုင်ရာ ဆုံးဖြတ်ချက်များအတွက် လမ်းညွှန်နိုင်ခြင်းစသည့် အချက်များကြောင့်ဖြစ်ပါသည်။ သို့သော် မြန်မာနိုင်ငံ၏ ဆန်စပါးဈေးကွက်တွင်မူ ဈေးကွက်မတည်ငြိမ်မှု၊ ဈေးနှုန်းအတက်အကျများကို ပိုဆိုးဝါးစေပြီး ယင်းကို ခန့်မှန်းရန်ခက်ခဲခြင်းကို ဖြစ်စေသည့် အချက်အချို့ရှိနေပါသည်။ ၎င်းသက်ရောက်မှုများသည် စားသုံးသူနှင့် တောင်သူများကို ပြင်းထန်သည့်ဆိုးကျိုးများ၊ ရိုက်ခတ်မှုများဖြစ်စေပါသည်။

ဆင်းရဲနွမ်းပါးမှုလျော့ချရေးနှင့်စားနပ်ရိက္ခာဖူလုံရေးကိုအထောက်အကူဖြစ်စေသည့်လယ်ယာလုပ်ငန်းဝင်ငွေနှင့် စားသုံးသူတို့၏သုံးစွဲမှုများအတက်ဆန်စပါးသည်အရေးပါခြင်းကြောင့်မြန်မာအစိုးရအတွက်ဆန်စပါးဈေးနှုန်းမတည်ငြိမ်ခြင်းသည်အရေးကြီးသည့်ကိစ္စရပ်ဖြစ်ပါသည်။

လယ်ယာစိုက်ပျိုးထုတ်လုပ်ရေးအပိုင်းတွင်ယင်းသို့ဈေးနှုန်းများမတည်ငြိမ်ခြင်းသည်တောင်သူများ၏ရောင်းလိုအားကို

အဟန့်အတားဖြစ်စေပြီးသွင်းအားစု(inputs)အသုံးပြုမှုနှင့်တိုးပွားလာသည့်ရင်းနှီးမြှုပ်နှံသူများအတွက်အနှောင့်အယှက်ဖြစ်စေပါသည်။ထို့ပြင်ဈေးနှုန်းမတည်ငြိမ်ခြင်းသည်ဆန်စပါးစိုက်ပျိုးသည့် လယ်သမားများအတွက် စားသုံးရန်ကောက်ပဲသီးနှံများကခန့်မှန်းနိုင်သော ဈေးနှုန်းဖြင့်ဝယ်ယူရန် မဖြစ်နိုင်ပါက ၎င်းတို့၏သီးနှံစိုက်ပျိုးမှုပုံစံကို တန်ဖိုးမြင့်မားသည့်ကောက်ပဲသီးနှံများဆီသို့ ပြောင်းလဲစိုက်ပျိုးရေးအတွက် အဟန့်အတားဖြစ်စေနိုင်ပါသည်။ စားသုံးမှုအပိုင်းတွင်လည်း ဆန်၊ စပါးဈေးနှုန်း များ မြင့်မားခြင်းသည် ဝယ်ယူစားသုံးမှုပမာဏကို သုံးစွဲရန်မပြည့်စုံသူများအတွက် အစား အစာမဖူလုံမှုကို ဖြစ်စေပါသည်။ ဝင်ငွေ၏ ၅၀%ကို ဆန်အတွက်အသုံးပြုနေရသူများအတွက် ဆန်စပါးဈေးနှုန်း ယာယီအားဖြင့် ၂၀%တိုးလာပါက ၎င်းတို့ဝင်ငွေကို ထိရောက်စွာသုံးစွဲရန်အတွက်၁၀%လျော့နည်းသွားပါသည်။ယင်းအချက်သည်ကျန်းမာရေးနှင့်ပညာရေးတို့အတွက်အသုံးပြုမည့်ပမာဏနှင့်ညီမျှနိုင်ပြီးသတိပြုရမည့်အချက်တစ်ခုဖြစ်ပါ သည်။

ချို့ယွင်းချက်ရှာဖွေဖော်ထုတ်ခြင်း၏ ကောင်းမွန်သည့် နည်းစနစ်တစ်ခုသည် ဖြေရှင်းရန်နည်းလမ်းများ ရွေးချယ်သတ်မှတ်နိုင်ရန် အရေးကြီးသည့်လိုအပ်ချက်ဖြစ်ပါသည်။

နိုင်ငံတကာအတွေ့အကြုံများအရ ဈေးနှုန်းမတည်ငြိမ်ခြင်းကိုဖြေရှင်းရာတွင် လက်တွေ့အခြေအနေများကို စိစစ်၍ချို့ယွင်းချက်ရှာဖွေဖော်ထုတ်နိုင်မည့်နည်းစနစ်ကောင်းတခုလိုအပ်ပါသည်။ ထိခိုက်စေနိုင်သည့် ဈေးနှုန်း မတည်ငြိမ်ခြင်းကို ဖော်ထုတ်ဖြေရှင်းခြင်းနှင့် ၎င်းကို ကြိုတင်ခန့်မှန်းနိုင်သည့်ဈေးနှုန်း အတက်အကျဖြစ်ခြင်းမျိုးမှ ခွဲခြား သတ်မှတ်ခြင်းတို့မှ မလွယ်ကူပါ။ ထို့အပြင် ဈေးနှုန်းမတည်ငြိမ်ခြင်းနှင့် ဈေးနှုန်းပမာဏတို့ကြားတွင်လည်း အပြန်အလှန် သက်ရောက်မှုရှိပါသည်။ဈေးနှုန်းတည်ငြိမ်မှုရှိစေရန်ဆောင်ရွက်ရာတွင်မကြာခဏဆိုသလိုဈေးနှုန်းပမာဏများအပေါ်သက် ရောက်မှုရပြီးဈေးနှုန်းတည်ငြိမ်မှုအကျိုးကျေးဇူးများကိုပြန်လည်ထိခိုက်စေခြင်းမျိုးဖြစ်တတ်ပါသည်။နိုင်ငံတကာအတွေ့ အကြုံအထောက်အထားများအရဈေးနှုန်းတည်ငြိမ်ခြင်းသက်သက်ဖြင့်လယ်ယာစိုက်ပျိုးရေးကဏ္ဍရေရှည်ဖွံ့ဖြိုးမှုကိုမရရှိနိုင် ပါ။အထူးသဖြင့်ဘေးထွက်ဆိုးကျိုးများရှိသောမူဝါဒများကိုအသုံးပြုပါကဖွံ့ဖြိုးမှုကိုအားနည်းယုတ်လျော့စေနိုင်ပါသည်။ထို့ကြောင့်တည်ငြိမ်သောဈေးနှုန်းများရရှိရန် မည်သို့ဆောင်ရွက်ရမည်ဆိုသည့်နည်းလမ်းမှာ အရေးကြီးပါသည်။

ဤအစီရင်ခံစာတွင် ဆန်စပါးဈေးနှုန်း မတည်ငြိမ်ခြင်း၏ သဘောသဘာဝနှင့် အတိုင်းအတာ၊ အဓိကအကြောင်း အရင်းများနှင့်မြန်မာ့ဆန်စပါးဈေးကွက်ရေရှည်ဖြစ်ထွန်းအောင်မြင်ရန်နည်းလမ်းများကိုလည်းစိစစ်သုံးသပ်ဖော်ပြထားပါသ န်။ဤအစီရင်ခံစာတွင်စံသတ်မှတ်ချက်ဆိုင်ရာကိစ္စရပ်များနှင့်ဖြစ်နိုင်သည့်ဖြေရှင်းဆောင်ရွက်ရန်နည်းလမ်းများအတွက်အ ဘရနှင့်ကမ္ဘာ့အနှံ့မှနိုင်ငံတကာအတွေ့အကြုံများကိုအခြေခံ၍ တင်ပြထားပါသည်။

မြန်မာနိုင်ငံရှိဆန်စပါးဈေးနှုန်း မတည်ငြိမ်မှုသည် ဖြစ်ပေါ် လျက်ရှိပါသည်။
မြန်မာနိုင်ငံအတွင်းရှိဒေသတွင်းစားသုံးသည့်အဓိကဆန်အမျိုးအစားနှစ်မျိုး(မနောသုခနှင့်ပေါ်ဆန်း)၏ဈေးနှုန်း သည် ၂၀၀၄-၂၀၁၃ခုနှစ်တာ ကာလအတွင်း မတည်ငြိမ်မှုဖြစ်နေလျက်ရှိပါသည်။ အဆိုပါကာလအတွင်း ပျမ်းမျှဈေးနှုန်း မတည်ငြိမ်မှု ပမာဏသည် ဒေသတွင်းအခြားဆန်တင်ပို့သည့်နိုင်ငံများထက် (ဥပမာ - ကမောဒီးယား၊ ထိုင်း၊ ဗီယက်နမ်) ကျော်လွန်ခဲ့ပါသည်။ အထူးသဖြင့်ဈေးနှုန်းမတည်ငြိမ်မှုသည် ပေါ်ဆန်း အမျိုးအစားတွင် ပိုမိုမြင့်မားနေခဲ့ပါသည်။
မြန်မာနိုင်ငံ၏ဆန်စပါးဈေးနှုန်းမတည်ငြိမ်မှုများသည်ဆန်စပါးဈေးကွက်အတွင်းတိုးတက်ကောင်းမွန်လာ

မများကြောင့်အချိန်နှင့်အမျှကျဆင်းလာခဲ့သော်လည်းနှိုင်းယှဉ်ပါက မြင့်မားနေဆဲပင်ဖြစ်ပါသည်။

၂၀၀၄-၂၀၁၃ကာလနှင့်နှိုင်းယှဉ်ပါက ၂၀၀၉-၂၀၁၃ကာလအတွင်းပေါ်ဆန်းနှင့်မနောသုခဆန်(၂)မျိုးစလုံးတွင်ပျမ်းမျှဈေးနှုန်းမတည်ငြိမ်မှုသည်၃၅%ခန့်လျော့နည်းခဲ့ပါသည်။လက်တလောစီးပွားရေးဖြေလျှော့မှုများနှင့် ဆန်ကိုနိုင်ငံခြားသို့တင်ပို့မှုမြှင့်တင်ခြင်းများကြောင့်ဤသို့ကျဆင်းလာခြင်းဖြစ်နိုင်ပါသည်။ထို့ပြင်၂၀၀၄ခုနှစ်အတွင်းဒေသဆိုင်ရာကူးသန်းရောင်းဝယ်ရေးအရံအတားများကိုဖယ်ရှားခြင်းကြောင့်ရောင်းဝယ်ခြင်းစွန့်စားမှုနှင့်ဈေးနှုန်းမတည်ငြိမ်ခြင်းများကိုလျော့ချစေခဲ့သည်။(ကနဦးဖြေလျှော့မှုများကြောင့်နောက်ပိုင်းဆန်စပါးဈေးကွက်ပိုမိုစည်းစနစ်ကျနကောင်းမွန်လာခြင်းမှလည်း အရေးကြီးသည့် အချက်ဖြစ်ပါသည်။)

ပြည်တွင်းနှင့် နိုင်ငံခြားသို့တင်ပို့သည့် ဆန်ဈေးနှုန်းများ ပေါင်းစပ်ဆောင်ရွက်မှုအားနည်းခြင်းက ဆန်စပါးဈေးကွက်အစိတ်အပိုင်းများကွဲနေခြင်းနှင့်ပြည်တွင်းရှိထောက်ပံ့သယ်ယူပို့ဆောင်ရေးကုန်ကျစရိတ်မြင့်မားခြင်းတို့ကိုရောင်ပြန်ဟက်နေပါသည်။ဥပမာအားဖြင့်ရန်ကုန်မြို့ရှိနိုင်ငံခြားတင်ပို့သည့်မထဆန်ဈေးနှုန်းအတက်/အကျသည်ဗီယက်နမ်နှင့်ထိုင်းနိုင်ငံတို့၏နိုင်ငံခြားတင်ပို့ဈေးနှုန်းအတက်/အကျအထက်နည်းပါးပါသည်။သို့သော်မထဆန်၏ဈေးနှုန်းမတည်ငြိမ်မှုနည်းပါးခြင်းသည်မနောသုခနှင့်ပေါ်ဆန်းဆန်အမျိုးအစားဆီသို့ရောက်ရှိနိုင်ခြင်းမရှိခဲ့ပါ။

ဈေးနှုန်းမတည်ငြိမ်ခြင်းအပြင်မြင့်မားလာနေသည့်ဆန်ဈေးနှုန်းများမှလည်းစိုးရိမ်ဖွယ်ရာဖြစ်ပါသည်။

၂၀၀၉နှင့်၂၀၁၃ခုနှစ်အကြားမထဆန်ဈေးနှုန်းများသည်အမေရိကန်ဒေါ်လာနှုန်းထားအရ၄၁%တိုးလာပြီးအိမ်နီးချင်းဆန်စပါးအသားတင်တင်ပို့သည့်နိုင်ငံများထက်များစွာပိုမိုများပြားနေပါသည်။မြန်မာနိုင်ငံရှိဆန်စပါးဈေးနှုန်းတိုးမြှင့်လာခြင်းသည်လက်တလောနှစ်များအတွင်းအများပြည်သူလုပ်ငန်းစာများတိုးမြှင့်ခြင်း၊တရုတ်ပြည်နှင့်ဆန်စပါးနယ်စပ်ကုန်သွယ်မှုတိုးမြှင့်လာခြင်းနှင့်စီးပွားရေးပြောင်းလဲမှုများ၏ယေဘုယျရလဒ်များကြောင့်ဖြစ်ပါသည်။

၂၀၁၃ခုနှစ်မကုန်မှီတွင်မြန်မာနိုင်ငံခြားဆန်တင်ပို့မှုဈေးနှုန်းများသည်ဗီယက်နမ်နှင့်ထိုင်းနိုင်ငံတို့၏ဆန်တင်ပို့မှုဈေးနှုန်းများနှင့်တန်းတူဖြစ်ခဲ့ပါသည်။အဆိုပါမြင့်မားသည့်ဈေးနှုန်းများသည်မြန်မာနိုင်ငံရှိနိုင်ငံခြားတင်ပို့သူများအတွက်ဖိအားများဖြစ်စေရုံသာမကဈေးနှုန်းတည်ငြိမ်ရေးတိုက်ရိုက်အစီအစဉ်များကြောင့်ဈေးနှုန်းပိုမိုမြင့်မားနိုင်သဖြင့်ဈေးနှုန်းမတည်ငြိမ်မှုစီမံခန့်ခွဲရေးနည်းလမ်းကောင်းများ လိုအပ်လာပါသည်။

မြန်မာနိုင်ငံရဈေးနှုန်းမတည်ငြိမ်မှုများသည် ပြည်တွင်းအချက်အလက်များမှ အဓိကအားဖြင့် အဆုံးအဖြတ်ပေးလျက်ရှိနေပါသည်။

မြန်မာနိုင်ငံတွင်းဈေးကွက်များရှိဆန်စပါးဈေးနှုန်းမတည်ငြိမ်မှုသည်အခြားနိုင်ငံများ၏ဈေးနှုန်းမတည်ငြိမ်မှုထက် မြင့်မားနေပါသည်။ နိုင်ငံခြားသို့ဆန်အသားတင်တင်ပို့သောနိုင်ငံဆိုသည့်အချက်ဖြင့် ပြည်တွင်း ဈေးနှုန်းမတည်ငြိမ်ခြင်းကိုရှင်းပြနိုင်ခြင်းမရှိပါ။ယခင်နှစ်များအတွင်းပြည်ပသို့ဆန်တင်ပို့မှုပမာဏသည်စုစုပေါင်းဆန်စပါးစိုက်ပျိုးထုတ်လုပ်မှု၏၉%သာရှိပါသည်။မြန်မာနိုင်ငံနိုင်ငံအနေဖြင့်ကမ္ဘာ့ဆန်ဈေးကွက်နှင့်လည်းပေါင်းစပ်ဆောင်ရွက်မှုအားနည်းလျက်ပင်ရှိပြီး၊ကမ္ဘာ့ဆန်ဈေးနှုန်းအတက်/အကျသည်ယခုအချိန်ထိမြန်မာနိုင်ငံသို့အပြည့်အဝသက်ရောက်နိုင်ခြင်းမရှိသေးပါ။ပြည်တွင်းဆန်/စပါးဈေးနှုန်းအတက်/အကျကိုဖြစ်စေသည့်အချက်အလက်များမှ ပြည်တွင်းမှသာဖြစ်ပါသည်။

ရာသီအလိုက်အပြောင်းအလဲများကမြန်မာနိုင်ငံရှိဆန်စပါးဈေးနှုန်းမတည်ငြိမ်ခြင်းဖြစ်ရသည့်အကြောင်းအရင်းအများဖြစ်ပါသည်။ နိုဝင်ဘာနှင့် ဒီဇင်ဘာလများအတွင်း အများစုသောစပါးထုတ်လုပ်ခြင်း /ရိပ်သိမ်းခြင်းကြောင့် ဒီဇင်ဘာနှင့် ဇန်နဝါရီလများအတွင်း ဆန်/စပါးဈေးနှုန်းသိသာစွာကျဆင်းမှုကိုဖြစ်ပေါ်စေပြီးမေနှင့် အောက်တိုဘာလများအတွင်း ဈေးကွက်အပေါ်မူတည်၍ သိသာစွာဈေးနှုန်းမြင့်မားလာခြင်းကို ဖြစ်စေပါသည်။

ရာသီအလိုက်ဆန်/စပါးဈေးနှုန်းအတက်/အကျများကိုအရှိန်မြှင့်စေသည့်အခြားအချက်များရှိပါသည်။ ၎င်းမှာပြည်တွင်းဈေးကွက်အတွင်းပေါင်းစပ်ဆောင်ရွက်မှုအားနည်းခြင်းကြောင့်ကွဲပြားခြားနားသည့် သည့်ဈေးကွက်များအကြား ဈေးနှုန်းဆိုင်ရာအချက်ပြ၊ အသိပေးမှုများ၊ ဆက်သွယ်၊ ချိတ်ဆက်မှုများကို ပေါ်စေပါသည်။ ပြည်တွင်းဈေးကွက်ပေါင်းစပ်ဆောင်ရွက်မှုအားနည်းခြင်းမှာဆန်ဈေးကွက်အစိတ်အပိုင်းကွဲနေခြင်း၊လမ်းပန်းဆက်သွယ်မှုအားနည်းခြင်းနှင့်တယ်လီဖုန်းလိုင်းကွန်ယက်အားနည်းချက်များကြောင့်ဖြစ်ပြီးယင်းတို့တိုးတက်ကောင်းမွန်စေရန်လည်းအချိန်ယူဆောင်ရွက်ရမည့်ကိစ္စရပ်များဖြစ်နေပါသည်။ထို့ပြင်ဈေးကွက်ပွင့်လင်းမြင်သာမှုအားနည်းခြင်းကြောင့်လည်းဖြစ်ပါသည်။စိုက်ပျိုးထုတ်လုပ်ခြင်း၊စားသုံးခြင်း၊ပြည်ပတင်ပို့ခြင်းနှင့် သိုလှောင်ခြင်း(stocks)စသည်တို့နှင့်ပတ်သက်သည့်သတင်းအချက်အလက်များအလွယ်တကူမရရှိနိုင်သလို ရရှိပါကလည်းတိကျမှုအားနည်းနေခြင်း တို့ကြောင့်ဈေးကွက်ရှိဆောင်ရွက်နေသူများနှင့်အစိုးရ မဆက်သွယ်မှုအားနည်းသောကြောင့်ဈေးနှုန်းအသေးအဖွဲ့ပြောင်းလဲမှုလေးများကို အလွန်အကျွံ တုံ့ပြန်ဆောင်ရွက်မိခြင်းမျိုးဖြစ်လေ့ရှိပြီးသေးငယ်သည့်ပုဂ္ဂလိကဆန်သိုလှောင်ကုန်(private stocks)များအတွက်ဈေးနှုန်းမတည်ငြိမ်ခြင်းကိုဖြစ်ပေါ်စေပါသည်။ ပြည်ပတင်ပို့မှုများ၏နိုင်ငံတကာဈေးကွက်သို့ထိုးဖောက်မှု အားနည်းခြင်းကလည်း မြန်မာနိုင်ငံတွင်းဈေးနှုန်းမတည်ငြိမ်မှုကို ဖြစ်ပေါ်စေပါသည်။ တရားဝင် ပြည်ပတင်ပို့မှုအများစုမှာ အာဖရိကသို့ဖြစ်၍ နယ်စပ်ကုန်သွယ်ပြည်ပတင်ပို့မှုအများစုမှာ တရုတ်ပြည်သို့ ဖြစ်ပါသည်။ တရုတ်ပြည်သို့ တင်ပို့မှုများမှာ တရားဝင်၊ မဟုတ်သည့်အပြင်တင်ပို့မှုပမာဏ ခန့်မှန်း ရန် ခက်ခဲမှုရှိပါသည်။

မြန်မာနိုင်ငံအနေဖြင့် ဆန်ဈေးနှုန်းမတည်ငြိမ်ခြင်းကို မည်သို့လျော့ချနိုင်သနည်း။

ဈေးနှုန်းမတည်ငြိမ်မှုလျော့ချနိုင်ရန်အခြေအနေကိုတွန်းအားပေးသည့်အဓိကဖော်ပြပါအချက်(၅)ချက်အပေါ် အလေးဂရုပြုဆောင်ရွက်ခြင်းဖြင့် ရေရှည်တည်တံ့ကောင်းမွန် သောရလဒ်များကို ရရှိနိုင်မည်ဖြစ်ပါသည်။၎င်းတို့မှာ

- (၁) ဆန်စပါးထုတ်လုပ်မှုကို မြှင့်တင်ခြင်း
- (၂) ထုတ်လုပ်မှုများကို တနှစ်တာကာလအတွင်း ညီမျှစွာထုတ်လုပ် ဖြန့်ဝေခြင်း
- (၃) ကနဦးထုတ်လုပ်မှု စီမံခန့်ခွဲခြင်း၊ထုတ်လုပ်မှု လုပ်ငန်းစဉ်နှင့် သိုလှောင်မှုများ တိုးတက်ကောင်းမွန်စေခြင်း
- (၄) ပြည်တွင်းဈေးကွက်ခိုင်မာခြင်း ပေါင်းစပ်ဆောင်ရွက်ခြင်းနှင့် ပွင့်လင်းမြင်သာမှု ရှိစေခြင်း
- (၅) ပြည်ပတင်ပို့မှုအထောက်အကူပြု မူဝါဒများချမှတ်ကျင့်သုံးခြင်းတို့ဖြစ်ပါသည်။

အဆိုပါအချက်များအနေဖြင့် ဈေးနှုန်းမတည်ငြိမ်မှုအပေါ် အကျိုးသက်ရောက်ဖြေရှင်းနိုင်ရန် အချိန်ယူဆောင်ရွက်ရမည်ဖြစ်ပါသည်။ သို့သော် လျှင်မြန်စွာအကောင်အထည်ဖော်ဆောင်ရွက်နိုင်ပြီး ပြည်သူ့ဘဏ္ဍာရေးရာအရ

ကုန်ကျစရိတ်မရှိ/သက်သာစွာဆောင်ရွက်နိုင်သော ဆန်စပါးတန်ဖိုးကွင်းဆက်တွင် ပါဝင်သူများအပေါ်ကျယ်ပြန့်စွာ အကျိုးသက်ရောက်မှုရှိသည့်မူဝါဒလုပ်ငန်းစဉ်များရှိပါသည်။ (ယင်းကို ဤစာတမ်းတွင်မျဉ်းသားဖော်ပြထားသည်။)။ အဆိုပါဦးစားပေးလုပ်ငန်းများသည်ဈေးနှုန်းမတည်ငြိမ်မှု၏နောက်ကွယ်ရှိအဓိကအကြောင်းအရင်းများ စတင်ဖြေရှင်း ရာတွင် အထောက်အကူပေးနိုင်မှာဖြစ်ပြီး လိုအပ်သော ကာလရှည်ရင်းနှီးမြှုပ်နှံမှုများနှင့် ဈေးနှုန်းမတည်ငြိမ်မှုကို သိသာစွာ လျော့ချနိုင်မည့် မူဝါဒများအတွက် နည်းလမ်းများကိုညွှန်ပြနိုင်မည်ဖြစ်ပါသည်။

ဈေးနှုန်းမတည်ငြိမ်မှုလျော့ချရေးဆောင်ရွက်ရာတွင်စိုက်ပျိုးထုတ်လုပ်မှု တိုးမြှင့်ခြင်းနှင့် ထုတ်လုပ်မှုများကို ဈေးကွက်တင်သည့်နှစ်တလျှောက်မျှတစွာဖြန့်ကြက်နိုင်ရန်လိုအပ်ပါသည်။ယင်းအတွက်တောင်သူများအတွက် ဆည်မြောင်း ရေလွယ်ကူစွာအသုံးပြုနိုင်မှုတိုးတက်ကောင်းမွန်ခြင်း၊ စိုက်ပျိုးကာလသက်တမ်း အလိုက် မျိုးစေ့များနှင့် ရှင်သန်ကြီးထွားမှုအချိန်ကာလမတူညီသောရိပ်သိမ်းချိန်များ၊လယ်ယာစိုက်ပျိုးရေးနည်းပညာဆိုင်ရာအကြံဉာဏ်များစသည့် အချက်များအပေါ်တွင် မူတည်ပါသည်။

လုပ်ငန်းဆောင်ရွက်မှုကုန်ကျစရိတ်သက်သာခြင်းနှင့်ဆန်စက်များ၊ကုန်သည်များအတွက်ရင်းနှီးမြှုပ်နှံမှုအတွက်ငွေ ကြေးရယူနိုင်မှုတိုးတက်ကောင်းမွန်ခြင်းများသည်သိလျှောင်မှုကုန်ကျစရိတ်သက်သာစေပြီးပုဂ္ဂလိကသိုလှောင်ကုန်(privat estocks)များတိုးပွား၍ဈေးနှုန်းအပြောင်းအလဲများကိုချောမွေ့စေမှာဖြစ်သည်။ယင်းကိုဆောင်ရွက်နိုင်စေရန်ဆန်စက်လုပ်ငန်းများတွင်နိုင်ငံခြားတိုက်ရိုက်ရင်းနှီးမြှုပ်နှံမှုများကိုဆွဲဆောင်နိုင်ရန်အတွက်နှင့်စက်ရများကိုမဟာဗျူဟာကဏ္ဍ များစာရင်းမှဖယ်ရှားရန်အစိုးရ၏အထူးအတည်ပြုချက်များ၊“အစိမ်းရောင်”များသာမဟုတ်ပဲရင်းနှီးမြှုပ်နှံမှု အမျိုးအစားများအားလုံးကိုခွင့်ပြုခြင်းများအစရှိသည်တို့လိုအပ်ပါသည်။မြန်မာနိုင်ငံအနေဖြင့်ပြည်တွင်းနှင့်ပြည်ပဈေးကွက် (၂)မျိုးစလုံးအတွက်စပါးမှတန်ဖိုးရှိသောဆန်အဖြစ်သို့လည်းကောင်း၊အရည်အသွေးမြင့်မားသည့်ဆန်များထုတ်လုပ်ခြင်း ဖြင့် လည်းကောင်း၊ထုတ်လုပ်မှု ကုန်ကျစရိတ်သက်သာမှု အပြိုင် အဆိုင်ရှိသော ဆန်စက်များလိုအပ်ပါသည်။ သို့မှသာ ဈေးနှုန်းမတည်ငြိမ်ခြင်းကို လျော့ချနိုင်ပါမည်။ ဆန်စက်လုပ်ငန်း ကဏ္ဍ ခေတ်မှီဆန်းသစ်ခြင်းဖြင့် လယ်ယာအဆင့်တွင် ရေရှည် တည်တံ့သော အပြောင်းအလဲများ (ထုတ်လုပ်အားမြှင့်မားခြင်း၊ စပါးအရည်အသွေးကောင်းမွန်ခြင်း၊ ထုတ်ကုန်များကိုမျှတစွာဖြန့်ကြက်နိုင်ခြင်း)နှင့်ကမ္ဘောဒီးယား၊ထိုင်းနှင့်ဗီယက်နမ်နိုင်ငံများကဲ့သို့အလားအလာရှိသော စပါးများစွာ ထုတ်လုပ်ခြင်းများကို ထုတ်ယူဆောင်ရွက်နိုင်သည့် စက်မှု လုပ်ငန်းကဏ္ဍပေါ်ထန်းလာစေမှာဖြစ်သည်။ ခေတ်မှီသည့်ဆန်စက်များ လက်ဝယ် ကုန်စည်သိုလှောင်မှု ပမာဏကို တိုးမြှင့်ရန် ကောင်းမွန်သောအနေအထားရနေခြင်း အားဖြင့် ဈေးနှုန်းမတည်ငြိမ်မှုကို ထပ်မံလျော့ကျစေမှာဖြစ်သည်။

ကျေးလက်လမ်းများနှင့်ဆက်သွယ်ရေးအခြေခံအဆောက်အအုံကဏ္ဍများတွင်ရင်းနှီးမြှုပ်နှံခြင်းသည် ဈေးကွက် ပေါင်းစပ်ဆောင်ရွက်မှုကို တိုးမြှင့်စေပါသည်။ ဈေးနှုန်းဆိုင်ရာ အချက်ပြမှုများသည် မြန်မာနိုင်ငံထက် ဈေးနှုန်းမတည်ငြိမ်လျော့နည်းသောကမ္ဘာ့ဈေးကွက်များအပါအဝင်ဈေးကွက်တစ်ခုခုသို့လျှင်မြန်စွာရောက်ရှိစေ မှာဖြစ်သည်။

ကျေးလက်ဒေသများအတွက်ထိရောက်ကောင်းမွန်သောသယ်ယူပို့ဆောင်ရေးဝန်ဆောင်မှုများ တိုးတက်စေခြင်းဖြင့်လမ်း အခြေခံအဆောက်အအုံများအတွက်ပြန်လည်ရရှိမည့်အကျိုးဖြစ်ထွန်းမှုနှုန်းများလည်းတိုးမြှင့်လာမည်ဖြစ်သည်။

ထိုသို့တိကျ၍အချိန်နှင့်တပြေးညီဖြစ်သောဈေးကွက်သတင်းအချက်အလက်များပြန်ပြုနိုင်ခြင်းဖြင့် ပုဂ္ဂလိကကဏ္ဍအား အထောက်အကူဖြစ်စေရုံသာမက အစိုးရအနေဖြင့်လည်း အချက်အလက်ပြည့်စုံ၍ ပိုမိုကျိုးကြောင်းဆီလျော်သော ဆုံးဖြတ်ချက်များ ချမှတ်ဆောင်ရွက်နိုင်လာမည်ဖြစ်ပါသည်။

အမျိုးမျိုးကွဲပြားသောထုတ်ကုန်များကတိုးပွားလာသောဈေးကွက်မသစ်များသို့တင်ပို့ခြင်း (ပထဝီဆိုင်ရာအနေအထားအရနှင့်အရည်အသွေး(၂)မျိုးစလုံးအားဖြင့်)သည်ဈေးနှုန်းမတည့်ငြိမ်မှုများကိုလျော့နည်းစေပါသည်။ ယင်းအတွက် ရှင်းလင်း၊ ပွင့်လင်း၍ စဉ်ဆက် မပြတ်သည့် ကုန်သွယ်ရေးမူဝါဒ လိုအပ်ပါသည်။၎င်းကိုပိုးမွှားရောဂါအရည်အသွေးစစ်စေးရေး(phytosanitary) အခြေခံအဆောက်အအုံများ၊ ဆိပ်ကမ်းများနှင့်စရိတ်သက်သောပြည်ပတင်ပို့ခြင်းလုပ်ငန်းစဉ်များတွင်ရင်းနှီးမြှုပ်နှံမှုများမှဖြည့်ဆည်းထောက်ပံ့နိုင်မည်ဖြစ်သည်။ ကမ္ဘာ့ဈေးကွက်များနှင့် ခိုင်မာသော ပေါင်းစပ် ဆောင်ရွက်ခြင်းဖြင့် ပြင်ပအခြေအနေများ၏ သက်ရောက်မှုကြောင့် ဈေးနှုန်းမတည့်ငြိမ်ခြင်းအန္တရာယ်တိုးလာနိုင်သော်လည်းဆန်စက်လုပ်ငန်းများ၊ပုဂ္ဂလိကကုန်စည်အခြေခံအဆောက်အအုံများနှင့် ပြည်ပ တင်ပို့မှု ထောက်ပံ့ဆောင်ရွက်ရေးကဏ္ဍများတွင် ရင်းနှီးမြှုပ်နှံမှုများမှ တဆင့် ပြည်တွင်းအခြေအနေများကြောင့် ဈေးနှုန်း မတည့်ငြိမ်ခြင်းအန္တရာယ်များကို လျော့ချနိုင်မည်ဖြစ်ပါသည်။

ကာလတိုဆန်ဈေးနှုန်းတည်ငြိမ်ရေးအစီအစဉ်များသည်အခြားမရည်ရွယ်သည့်ဆိုးကျိုးများရှိနိုင်ခြင်းကြောင့် ၎င်း တို့ကို အထူးသတိပြု၍ အသုံးပြုသင့်ပါသည်

မြန်မာနိုင်ငံရှိဆန်ဈေးနှုန်းတည်ငြိမ်ရေးအတွက်ထိရောက်သည့်ဆောင်ရွက်မှုများသည်အခြားနိုင်ငံများနည်းတူအချိန်အရင်းအမြစ်များနှင့်ကတိကဝတ်များလိုအပ်ပါသည်။ကာလရှည်ဖွဲ့စည်းပုံဆိုင်ရာကိစ္စရပ်များဖြေရှင်းရာတွင် ဖြတ်လမ်း (သို့) အစားထိုးနည်းလမ်းများမရှိဘဲ စိုက်ပျိုးရေးနှင့် အခြေခံအဆောက်အအုံကဏ္ဍ ရင်းနှီးမြှုပ်နှံမှုများ၊ တိုးတက်ကောင်းမွန်သည့်ရင်းနှီးမြှုပ်နှံမှုဆိုင်ရာ အခြေအနေကောင်း များ၊ လူမှုရေးရာ လုံခြုံစိတ်ချရမှု(social net) များဖြင့်သာဆောင်ရွက်ရမည်ဖြစ်သည်။ အဆိုပါ မူဝါဒများနှင့် ရင်းနှီးမြှုပ်နှံမှုများသည် ဆန်ဈေးနှုန်းမတည့်ငြိမ်မှုကို သွယ်ဝက် လျော့ချနိုင်မှာဖြစ်ပြီး လက်ကျန် ဈေးနှုန်းမတည့်ငြိမ်မှု၏ အကျိုးဆက်များကိုလည်း လျော့နည်းသွားစေမှာဖြစ်သည်။

အခြားနိုင်ငံများတွင်ရရှိခဲ့သည်အတွေ့အကြုံ၊သင်ခန်းစာများအရ ကာလတိုဈေးနှုန်းတည်ငြိမ်ရေး တိုက်ရိုက်အစီအစဉ်များသည်စရိတ်သက်သာမှုမရှိဘဲမကြာခဏဆိုသလိုမရည်ရွယ်သည့်အခြားဆိုးကျိုးသက်ရောက်မှုများရှိတတ်ပါသည်။ ဆန်စပါးဈေးနှုန်းမတည့်ငြိမ်မှုအတွက် ကာလတို တိုက်ရိုက်စီမံခန့်ခွဲမှုများသည် အစားအစာဖူလုံမှုနှင့် ဆင်းရဲနွမ်းပါးမှုလျော့ချရေးအတွက်အောင်မြင်သည့်ရလဒ်ကောင်းများရရှိရန်ခဲယဉ်းပါသည်။

မြန်မာနိုင်ငံတွင်လတ်တလောကျင့်သုံးသည့်မူဝါဒအစီအစဉ်များဖြစ်သည့်ပြည်ပတင်ပို့မှုကန့်သတ်ခြင်းများ၊လယ်ယာစက်ပျိုးရေးအနိမ့်ဆုံးဈေးနှုန်းများနှင့်အစိုးရပိုင်(gov:stocks)များစသည်တို့သည်အချို့သောဈေးနှုန်းမတည့်ငြိမ်မှုကိုလျော့ချရာတွင်အထောက်အကူဖြစ်နိုင်သော်လည်းကုန်ကျစရိတ်များသည်အကျိုးအမြတ်ထက်ပိုမိုများပြားပါလိမ့်မည်။ ဥပမာအားဖြင့်အင်ဒိုနီးရှားနှင့်ဖိလစ်ပိုင်နိုင်ငံများတွင်ကြီးမားသည့်အများပြည်သူပိုင်ကုန်စည်အစီအစဉ်များနှင့် ဆန်တင်သွင်းမှုအပေါ်လက်ဝါးကြီးအုပ်ထိန်းချုပ်မှုများသည်ဈေးနှုန်းမတည့်ငြိမ်မှုလျော့ချရာတွင်စားသုံးသူများအတွက်

အောင်မြင်သော်လည်း တောင်သူများ အတွက် မအောင်မြင်ပါ။ ထို့ပြင် ၎င်းအစီအစဉ်များက ဆန်ဈေးနှုန်းများကိုတိုးမြှင့်စေပြီးမြို့ပြစားသုံးသူများ၏ဆင်းရဲနွမ်းပါးမှုတိုးမြှင့်ခြင်း၊ပုဂ္ဂလိကကဏ္ဍကထိခိုက်ဖြစ်ခြင်းနှင့်လယ်ယာစိုက်ပျိုးရေးကုန်ထုတ်လုပ်မှုအများပြည်သူဆိုင်ရာကုန်ကျစရိတ်ပိုလာခြင်းစသည့်တိုက်ရိုက်အကျိုးဆက်များဖြစ်ပေါ်စေပါသည်။

ထိုင်းနိုင်ငံတွင် ၂၀၁၁ခုနှစ်တွင်ပြဋ္ဌာန်းသည့်မြင့်မာသည့်အနည်းဆုံးလယ်ယာစိုက်ပျိုးဈေးနှုန်းများသည်တောင်သူများအတွက် ဈေးနှုန်းမတည် ငြိမ်မှုကို လျော့ချရာတွင် အထောက်အကူဖြစ်သော်လည်း စားသုံးသူများနှင့်ပြည်ပတင်ပို့သူများအတွက်အထောက်အကူ မဖြစ်ပါ။ ပို၍အရေးကြီးသည့်အချက်မှာ ၎င်းအချက်များသည် ဆန်ဈေးနှုန်းမြင့်မားခြင်း၊ကြီးမားသည့်အခွန်ဘဏ္ဍာစရိတ်များပြည်ပတင်ပို့မှုလျော့နည်းခြင်း၊ဆန်အရည်အသွေးကျဆင်းခြင်း၊ ထုတ်လုပ်မှုစရိတ်တိုးမြှင့်ခြင်းနှင့်အခြားစီးပွားရေးဆိုင်ရာယိုယွင်းခြင်း ရလဒ်ဖြစ်စေပါသည်။

အခြားနိုင်ငံများ၏အတွေ့အကြုံများကိုအခြေခံ၍မြန်မာနိုင်ငံအတွက်ကောက်နုတ်ချက်မှာကာလတိုဈေးနှုန်းတည်ငြိမ်ရေးအစီအစဉ်များဖြင့်ဈေးနှုန်းမငြိမ်သက်မှုလျော့ချခြင်းနှင့်ဈေးနှုန်းပမာဏအပြိုင်အဆိုင်ဖြစ်ခြင်းကထိန်းထားခြင်းဆိုသည့်အချက်များအကြားတွင်သိသာသည့်အားမျှခြေရသည်ဆိုသည့်အချက်ဖြစ်သည်။

ပမာဏများပြားသည့်အများပြည်သူပိုင်ကုန်စည်များ(public stocks)(သို့)လယ်ယာစိုက်ပျိုးရေးအနည်းဆုံးဈေးနှုန်းများစသည့် ဈေးနှုန်း မတည်ငြိမ်မှုလျော့ချရန် ရည်ရွယ်သည့် အချို့သောအစီအစဉ်များသည် ပြည်တွင်းဈေးနှုန်းများကို ကမ္ဘာ့ဈေးကွက် ပေါက်ဈေးနှုန်းထက် မြင့်များသွားစေတတ်ပြီး မြန်မာနိုင်ငံအနေဖြင့် ရည်မှန်းသည့်ဆန်ပြည်ပတင်ပို့မှုအကေခိုင်အဖြစ် တိုးတက်မှုကို ကြန့်ကြာစေနိုင်ပါသည်။ အခြားနည်းလမ်းများဖြစ်သော (ဥပမာ-ပြည်ပဆန်တင်ပို့မှုကန့်သတ်ခြင်း)သည်လည်း ပြည်တွင်း ဈေးနှုန်းများကို ကမ္ဘာ့ဆန်ဈေးကွက်ပမာဏအောက်သို့ကျဆင်းမှုဖြစ်စေခြင်း၊ ဆန်စက်လုပ်ငန်းများနှင့် ကုန်သွယ်မှုကဏ္ဍများတွင် ရင်းနှီးမြှုပ်နှံမှုများကို အဟန့်အတားဖြစ်စေခြင်း၊ ဆန်ပြည်ပတင်ပို့သောအဓိကနိုင်ငံအဖြစ်ယုံကြည်မှုလျော့ပါးစေခြင်းတို့ကိုဖြစ်ပေါ်စေပါသည်။

ယာယီလူမှုရေးရာလုံခြုံမှု(social nets) အစီအမံများသည် အသားတင်စားသုံးသူများသို့သက်ရောက်သည့် ယာယီဈေးနှုန်း တိုးမြှင့်ခြင်းကို လျော့ချရာတွင် ထိရောက်မှုရပါသည်။

ထိခိုက်မှုအများဆုံးဖြစ်နိုင်မည့်သူများအတွက် ကာလတိုဈေးနှုန်း မငြိမ်သက်မှု၏အကျိုးဆက်များလျော့ချရန် လူမှုရေးရာ လုံခြုံမှု အစီအမံများကို အသုံးပြုနိုင်ပါသည်။ ရာသလွန်ကာလများအတွင်း ဆန်ဈေးနှုန်းသိသာစွာတိုးမြှင့်ခြင်းဖြစ်ပါက အများပြည်သူလုပ်ငန်း (လုပ်ငန်းအခကြေးငွေ)အစီအစဉ်များသည် မြန်မာနိုင်ငံအတွင်း ရာသီအလိုက် အလုပ်လက်မဲ့ဖြစ်ခြင်းနှင့် အစားအစာမယူလုံခြုံခြင်းပြဿနာများကို ဖြေရှင်းရာတွင် အထောက်အကူဖြစ်ပါသည်။ နိုင်ငံတကာအတွေ့အကြုံများအရ လူမှုရေးရာ လုံခြုံမှု အစီအမံများသည် ဝင်ငွေနည်းနိုင်ငံများ တွင်ပင် ကောင်းမွန်သောရလဒ်များ ရရှိစေနိုင်ကြောင်းတွေ့ရပါသည်။ သို့သော် ကောင်းစွာစီမံဆောင်ရွက်ရန် အထူးလိုအပ်ပါသည်။ ဥပမာ - နိုင်ငံအများစုတွင် ငွေသားအခြေခံအကူအညီ (ထိခိုက်မှုအများဆုံးဖြစ်နိုင်မည့်သူများထံသို့ တိုက်ရိုက်ပေးအပ်ခြင်းဖြင့်ဖြစ်စေ (သို့) အများပြည်သူလုပ်ငန်းအစီအစဉ်များမှတစ်ဆင့်ဖြစ်စေ)များသည် အစိုးရပိုင်ကုန်စည်(govt stocks) များမှ အစားအစာဖြန့်ဝေခြင်းထက်စာလျှင် လူမှုရေးရာနှင့်

စီးပွားရေးရာဦးတည်ချက်များအောင်မြင်ရန် ပိုမိုထိရောက်မှု ရှိကြောင်းတွေ့ရှိရပါသည်။ မြန်မာနိုင်ငံအနေဖြင့် အဆိုပါ လုံခြုံမှု အစီအမံများက(safety net) မြန်နိုင်သမျှ မြန်မြန် ထိရောက်စွာမှသာ မကြာမှီ အနာဂတ်ကာလတွင် ဆင်းရဲနွမ်းပါးသည့် စားသုံးသူများအပေါ် သက်ညှာမည့်ဆန်ဈေးနှုန်း မတည်ငြိမ်မှု ဆိုးကျိုးများကို ထိရောက်စွာလျော့ချနိုင်ရန် ဆောင်ရွက်နိုင်မည်ဖြစ်ပါသည်။

EXECUTIVE SUMMARY

Rice price volatility matters for poverty reduction in Myanmar

Myanmar is a low-income agrarian country with a high poverty rate. The livelihood of many poor people depends on the performance of agriculture, especially the rice sector. Rice accounts for 70 percent of Myanmar's total cultivated area and 30 percent of the value of its agricultural production. Increasing returns to rice production will be the key to increasing farm wages and incomes in the short to medium run. Higher rice production will also help maintain low food prices, improve food security, and reduce poverty, as an average household spends 61 percent of total household income on food, and rice is a major component of the food basket.

Price fluctuations are a common feature of well-functioning agricultural markets. Price fluctuation should be expected in such markets, since output varies from period to period due to factors such as weather, pests and disease, and because demand and supply are inelastic in the short run. Moreover, some amount of seasonal and spatial price movements should be tolerated, since these usefully signal scarcity in the market and facilitate a supply response, foster arbitrage between surplus and deficit regions, as well as guide post-harvest handling, storage and trade decisions. However, in the case of Myanmar's rice market, several factors serve to exacerbate price fluctuation and make them more pronounced and unpredictable (volatile) and lead to serious negative impacts for consumers and farmers.

Rice price volatility is of concern to the Myanmar government given the high importance of rice for farm incomes and consumer expenditures, and thereby for food security and poverty reduction. On the production side, price volatility inhibits farmers' supply response and is a disincentive for greater use of purchased inputs and increased investments. Volatility can also discourage rice-producing farmers to diversify their cropping patterns to high-value crops if they cannot buy cereals for consumption at more predictable prices. On the consumption side, rice price spikes can cause increased food insecurity for those not wealthy enough to maintain consumption levels at the higher prices. For people spending 50 percent of their income on rice, a 20 percent temporary increase in rice prices would lead to an approximate 10 percent decline in effective income. This is a large shock, often equivalent to households' spending on health and education.

A good diagnostic is a precondition to identifying suitable remedies

International experience shows that addressing price volatility requires a good diagnostic assessment of the actual situation. Detecting and addressing harmful price volatility as well as differentiating it from anticipated price fluctuations is not easy. In addition, there is a strong interplay between price volatility and price levels, and efforts to achieve price stability often distort price levels, which in turn can undermine the benefits of price stability. The international evidence suggests that stable prices per se do not generate long-term agricultural growth, and indeed can undermine growth if achieved through policies with distortionary side effects. That is why it matters how stable prices are achieved.

This report examines the extent and nature of rice price volatility, its main sources, and outlines options for achieving sustainable outcomes in rice markets in Myanmar. The report draws on international experience from Asia and around the world for benchmarking purposes and for possible remedies.

Rice prices in Myanmar have been volatile, but the recent increase of price level is an emerging concern

Rice prices of two major locally consumed rice varieties in Myanmar – Manawthukha and Pawsan – showed marked volatility during 2004-2013. During this period, the average price volatility was above the level of peer net rice-exporting countries, e.g., Cambodia, Thailand, and Vietnam. The volatility was especially high for Pawsan.

Rice price volatility in Myanmar has declined over time with positive developments in the rice market, but remains relatively high. The average price volatility of both Pawsan and Manawthukha was about 35 percent lower during 2009-2013 than during 2004-2013. The recent economic liberalization and promotion of rice exports are likely to have contributed to this lower volatility. Also importantly, the rice market became more organized after the initial liberalization in 2004 when local barriers to trade were removed, helping bring down risks and volatility.

Domestic and export rice prices are weakly integrated, largely a reflection of rice market segmentation and high logistical costs in Myanmar. For instance, the price volatility of exported Emata rice in Yangon was lower than that of Vietnamese and Thai export prices. Yet the relatively low volatility of Emata rice was not passed through to Manawthukha and Pawsan.

Beyond price volatility, rising price levels are an emerging concern. Emata prices increased by 41 percent in nominal US\$ terms between 2009 and 2013, much more than in the peer rice net-exporting countries. The increase of rice prices in Myanmar was a result of the large public wage increases in recent years, the increased cross-border trade in rice with China, and economic transition in general. By the end of 2013, Myanmar rice export prices had essentially equalized with the export prices in Vietnam and Thailand. These higher prices not only put pressure on Myanmar exporters but also call for careful management of price volatility as direct price stabilization measures can further increase prices.

Price volatility in Myanmar has been mainly determined by local forces

Rice price volatility in local markets in Myanmar is higher than the price volatility in other countries. Myanmar's status as a net rice exporter does not explain much of its high domestic price volatility. Rice exports only accounted for up to 9 percent of total rice production in recent years. The country is still weakly integrated with the world rice market; i.e., the world price's volatility is not yet fully passed onto Myanmar. Most drivers of domestic rice price volatility in Myanmar were internal.

Seasonal variations explain much of the volatility in rice prices in Myanmar. The high concentration of paddy production in November and December resulted in sharp drops of paddy and rice prices in December and January and sharp rises between May and October, depending on the market.

Other factors amplify the seasonal volatility in rice prices. Weak domestic market integration has prevented price signals from being transmitted quickly between different markets. Weak domestic integration is a result of the fragmented rice market, poor roads and low phone connectivity, the improvement of which will take time. But it is also a result of weak market transparency. Data on production, consumption, exports, and stocks, even if available, are not accurate. As a result, market participants and the government often overreact to small changes in prices, which ignite volatility given the small size of private rice stocks. Weak geographic diversification of exports also contributes to price volatility in Myanmar. Most formal exports go to Africa, while China absorbs most of the cross-border exports. The latter are informal and reported to be highly unpredictable.

Stabilizing rice prices requires long-term investments to address its structural causes

Efforts to reduce price volatility focused on the main exacerbating factors would have the best chance of sustainable results, including measures in five broad areas: (i) raising rice productivity; (ii) spreading production more evenly over the year; (iii) improving post production handling, processing and storage; (iv) strengthening domestic market transparency and integration; and (v) adopting policies supportive of exports.

Many of these factors require time to have impact on price volatility. But there are a number of policy actions that can be implemented quickly, at no or low cost to the public finance, and with a broad impact on the rice value chain's participants (these are underlined in the text). These priority actions can help start addressing underlying driving forces of price volatility and lead the way to the needed longer-term investments and policies to significantly reduce volatility.

A reduction in price volatility would require both increasing production and spreading production more evenly over the marketing year. This would, in turn, depend on farmers' improved access to irrigation, seeds with different harvesting periods and growth duration, and farm advice on production technologies.

Lower costs of doing business and improved access to finance for rice mills and traders would reduce storage costs and increase private stocks which would smooth price fluctuations. This could be facilitated through making the rice milling industry more attractive for foreign direct investment by removing the industry from the list of strategic sectors requiring special government approval and permitting all types of investments, not just "green" ones. Myanmar needs cost-efficient and competitive mills to turn paddy into valuable rice for both domestic and foreign markets and improve rice quality, and thereby reducing price volatility. A modernization of the rice industry can trigger lasting changes at the farm level (higher productivity, better paddy quality, and more evenly spread production) and allow the industry absorbing a potentially larger paddy production, as has happened in Cambodia, Thailand, and Vietnam. Modernized rice mills will be also better positioned to increase the level of private stocks which would further reduce price volatility.

Investments in rural roads and telecom infrastructure would increase market integration: signals would pass more quickly from one market to another, including from world markets with lower price volatility than in Myanmar. Developing efficient transportation services for rural areas would increase rates of return in road infrastructure. More accurate and timely distributed market information would help the private sector and the government to make more rational and informed decisions.

Diversification of exports to additional markets – both geographically and by quality – would further contribute to lower price volatility. This would require continuation of an unambiguous open trade policy. It could be further supported by investments in sanitary and phytosanitary infrastructure, ports, and less costly export procedures. While stronger integration of Myanmar with world markets will increase the risk of price volatility from external factors, it will also encourage investments in rice mills, private storage infrastructure, and export logistics, which will lower the risk of price volatility from domestic factors.

Short-term rice price stabilization measures should be used with caution since they can have unintended adverse impacts

Effectively stabilizing rice prices will take time, resources, and commitment in Myanmar, as elsewhere.

There are no shortcuts or substitutes for addressing long-term structural issues through investments in agriculture and infrastructure, an improved investment climate, and social safety nets. All of these policies and investments will indirectly reduce rice price volatility and mitigate the impact of residual price volatility.

Lessons of experience in other countries indicate that direct short-term price stabilization measures are not cost-effective and often have unintended adverse impacts. Direct management of short-term rice price volatility rarely produces successful outcomes for food security and poverty reduction.

Policy measures such as export restrictions, farm minimum prices, and government-owned stocks, currently being considered in Myanmar, may help reduce some price volatility but their costs will exceed their benefits. In Indonesia and the Philippines, for example, large public stock programs, along with monopoly over rice imports, have succeeded in reducing price volatility for consumers but not for farmers. In addition, these programs have pushed rice prices up, directly increasing urban consumers' poverty, penalized the private sector, and crowded out more productive agricultural public expenditure. In Thailand, high minimum farm prices introduced in 2011 helped reduce price volatility for farmers but failed to reduce it for consumers and exporters. More importantly, they resulted in high rice prices, large fiscal costs, lower exports, deteriorated rice quality, increased production costs, and many other economic distortions.

The takeaway for Myanmar from the experience of other countries is that there is a significant trade-off between lowering price volatility with short-term price stabilization measures and maintaining price (level) competitiveness. Some measures aimed at lowering price volatility such as large public stocks or farm minimum prices often put domestic prices above world market prices, and would thereby impede progress towards Myanmar's aspiration to become a large exporter. Other measures, such as export restrictions, would also impede export competitiveness by depressing domestic prices below the world market level, hampering investments in rice mills and trade sectors and undermining Myanmar's reputation as a reliable exporter.

Temporary social safety nets have proven to be effective in mitigating the impact of temporary price increases on net consumers

Social safety nets can be developed to mitigate the impacts of short-term price volatility on the most vulnerable. When rice prices sharply increase during off-seasons, public work (or cash for work) programs can help address seasonal unemployment and food insecurity in Myanmar. The international experience suggests that social safety nets can deliver good results even in low-income countries but they need to be carefully designed. For example, in many countries cash-based assistance, either through direct transfers to the most vulnerable or through public work programs, has proven to be more effective than food distribution from government-owned stocks at achieving most social and economic objectives. Myanmar would need to begin developing such safety nets as early as possible to be able to effectively mitigate negative impacts of rice price spikes on poor consumer in near future.

1. Introduction

1. Rice is the main food staple in Myanmar. It accounts for 25 percent of the consumption of richer households and 50 percent of the consumption of poorer households. Rice prices affect poverty, which was estimated at 37.5 percent in 2010 (World Bank 2014c). Rice is also Myanmar's main agricultural product and the second most important exportable agricultural commodity after beans and pulses, and is thus a very important income source for farmers. In 2010-2011, paddy planted area accounted for 70 percent of the total arable area, 30 percent of Myanmar's gross agricultural output, and 95 percent of total cereal output, according to FAOSTAT.

2. Rice price volatility is therefore a matter of concern for everyone.¹ Farmers are concerned about sharp price drops after the harvest and about price uncertainty. Consumers are hurt by price spikes and in general by higher off-season food prices. Exporters can be hurt by domestic price spikes when an export contract is already signed with a fixed price. As is the case in most Asian countries, the Government of the Republic of the Union of Myanmar (government) is concerned about price volatility, considering more stable prices to be a precondition for generating agricultural growth, reducing poverty, and maintaining political stability.

3. Rice price volatility can be driven by external and internal factors. World market price volatility could be partially responsible for the high price volatility in Myanmar. Yet given the (still) relatively weak integration of Myanmar's markets with world markets, domestic factors are likely to play a much bigger role.

4. There is also a strong interplay between price levels and volatility. Often price stability measures elevate or depress average price levels. Therefore, making rice prices more stable requires a thorough analysis of the factors underpinning volatility and a careful choice of tools to affect it. Given Myanmar's aspirations to become a large net exporter, stabilization efforts need to keep its rice prices at competitive levels vis-à-vis other exporters.

5. It is worth noting that not all volatility is harmful. Price fluctuations are a common feature of well-functioning agricultural markets. Price fluctuation should be expected in such markets, since output varies from period to period due to factors such as weather, pests and disease, and because demand and supply are inelastic in the short run. Moreover, some amount of seasonal and spatial price movements should be tolerated, since these usefully signal scarcity in the market and facilitate a supply response, foster arbitrage between surplus and deficit regions, as well as guide post-harvest handling, storage and trade decisions. Should volatility be a concern, attention needs to be paid to uncertain price movements, which are difficult to predict and disruptive for economic decisions.

¹ In Myanmar, price volatility is also a concern for other agricultural commodities such as beans and pulses. However, for beans and pulses volatility is largely determined by external factors (e.g., price developments in India). Myanmar's domestic prices closely follow prices in Mumbai. Few policy options are available in the short run to mitigate that volatility, and food security concerns for those crops are usually much lower than for rice. The focus of this report is therefore on rice.

6. Not all instruments are able to achieve lower price volatility without undermining food security.² One lesson from the international experience on price stabilization is that choosing the right instruments is the key to translating price stability into higher food security. For example, more volatile prices combined with market-oriented trade policy are superior to less volatile prices achieved through state trade interventions. In Cambodia, for example, rice output grew by 6 percent annually between 2002 and 2012 compared to only 1 percent annually in Indonesia,³ although prices in Cambodia were more volatile. The difference between these two countries lies in their approaches to rice sector development. Cambodia has been pursuing an open trade policy while Indonesia has been pursuing an inward-oriented policy, with monopoly over trade and with large government-owned stocks.

7. The bottom line is that stable prices *per se* do not generate growth. This is especially so when the instruments used to achieve stability undermine private investment, worsen food availability and access to food, drain fiscal resources, and crowd out investment in public goods. When this happens, stable prices may actually increase poverty, distort economic decisions, and eventually lower the quality of growth.

8. Against this background, the report seeks to assist the Government of Myanmar in studying the causes of rice price volatility and identifying options for reducing rice price volatility to achieve food security objectives. Chapter 2 explains the role of rice prices (i.e., their level and stability), in reducing poverty and enhancing food security in Myanmar. Chapter 3 reviews rice price developments in Myanmar, including the interplay between rice price level and price volatility. Chapter 4 analyzes the drivers of price volatility, considering both external and internal factors. Chapter 5 presents lessons from international experience, through the lens of their suitability for Myanmar to achieve its food security and poverty reduction objectives. Chapter 6 concludes and provides policy recommendations.

2 Price volatility is only one pillar of food security. Food security encompasses four pillars: food availability, access to food, food use, and stability, according to the 2009 World Summit on Food Security. Availability (supply) and access to food (demand) are of similar and often greater importance than price stability.

3 Estimated using data from the Foreign Agricultural Service (FAS) of the US Department of Agriculture (USDA) at <http://apps.fas.usda.gov/psdonline/psdquery.aspx>.

2. Rice Prices and Poverty in Myanmar

9. Myanmar is a low-income country with a high poverty rate. Poverty is estimated to have been 37.5 percent in 2010 (World Bank 2014c), higher than previously reported (25.6 percent). The majority of the poor (76 percent) live in rural areas. The highest number of poor live in the Delta and the Dry Zone, two major agricultural regions. Many small farmers are poor, but the rural landless are among the poorest. Urban poverty is also high, estimated at 34.6 percent. Even Yangon, the commercial hub of the country, has a poverty rate of 34 percent.

10. Many farmers are poor or vulnerable, living close to the poverty line and at high risk of falling into poverty. Their pathway out of poverty depends on income generation from agriculture. Myanmar is still an agrarian country. According to official national accounts estimates for 2010, the agriculture sector employed 52 percent of the workforce and generated 37 percent of GDP. Rice is the main agricultural product, accounting for about 70 percent of total cultivated area in the country, 30 percent of agricultural production, and 97 percent of total grain production by value in 2010-2011, according to FAOSTAT. Thus, the key to increasing agricultural incomes at this point is increasing returns to rice production. Without higher economic returns to rice production it is hard to imagine a substantial increase in agricultural incomes in the medium run.⁴ With the lowest average paddy yield in the Association of Southeast Asian Nations (ASEAN) (World Bank 2014b), Myanmar is well positioned to significantly raise yields, thereby increasing the incomes of farmers and the many landless who earn their income from seasonal farm work.

11. Consumers also depend on agriculture through the food price link. The majority of the urban population is net buyers of rice. In addition, rural landless and small farmers with less than 1 hectare (ha) of agricultural land (accounting for about 30 percent of farm households) are also net rice buyers. There is no estimate of the number of net buyers versus net sellers of rice in Myanmar, but based on international experience it is likely that the country has more buyers than sellers. Myanmar consumers spend an average of 61 percent of their total expenditures on food (World Bank 2014c).⁵ The expenditure share of rice ranges from 25 percent for better off people to 50 percent for the poorest.⁶ Higher rice prices reduce effective purchasing power, leaving less money available to spend on foods with the essential vitamins, minerals, and amino acids that are lacking in rice. Higher rice prices also result in less money available to spend on other essential non-food items.

12. Agricultural development has been crucial for poverty reduction and improved food security in Asia. Between 1990-1992 and 2010-2012, higher agricultural output was the largest contributor to the reduction of undernourishment in Asia and the large contributor to poverty reduction in the region (Warr 2013). On the other hand, higher food prices significantly increased the rate of undernourishment. Therefore, to improve food security and reduce poverty, higher agricultural production and lower food prices are needed. What was true for many middle-income Asian countries in the past is true for Myanmar today.

⁴ In contrast to Myanmar, the importance of rice in most Asian countries has reduced over time. Between 1961 and 2007, the share of rice in agricultural production in East Asia declined from 19 percent to 8 percent, while in Southeast Asia this decline was from 40 percent to 32 percent. Jaffe *et al.* (2014) use the metaphor of rice being produced under the widening shadow of skyscrapers. Many countries therefore have moved from rice-based strategies to reduce food security and poverty. As Myanmar's situation is different, it still needs to pay high attention to the rice sector to reduce poverty.

⁵ In Myanmar, the poorest 20 percent of households spend on average 74 percent of total expenditure on food. The richest 10 percent spend 39 percent on food.

⁶ The 2010 poverty survey does not estimate the share of rice in food expenditures. Anecdotal estimates range between 25 percent and 50 percent.

13. Food prices are important for achieving food security and thus reducing poverty. The definition of food security has evolved over time. During the 1950s, food security was generally equated with a secure and adequate food supply. Food aid programs during the 1960s emphasized the need to ensure people's physical access to food as the expanded supply of food during the Green Revolution did not eliminate persistent hunger and periodic cases of famine (Dawe and Jaffee 2014). Since the 1990s, the concept of food security has evolved beyond the aspects of supply and demand to draw attention to the effective utilization of food – that is its contribution to nutritional status. In the late 2000s, the large volatility of global food prices raised the importance of price volatility in ensuring food security.

14. Rice price volatility affects both supply and demand aspects of food security in Myanmar. *On the supply side*, farmers benefit from stable prices because they are protected from periods of unusually low prices. With more stable prices, farmers in general can accelerate their supply response through better access to finance, greater use of purchased inputs, and ultimately increased investments. Less volatility can encourage rice-producing farmers to diversify their cropping patterns to high-value crops if they can buy cereals for consumption at more predictable prices. *On the demand side*, sharp rice price increases can cause food insecurity for those not wealthy enough to maintain consumption levels at the higher prices. Rice is likely to account for 50 percent of expenditures of the poorest quarter of Myanmar's population. For these people, a 20 percent increase in rice prices would lead to an approximate 10 percent decline in effective income. This is a large shock, often equivalent to their spending on health and education (World Bank 2014c). More stable prices also allow consumers to diversify their diets and increase their intake of proteins, vitamins, and minerals – crucial for reducing malnutrition.

15. In addition, where food is a large share of household expenditures as in Myanmar, less volatile rice prices can generate economy-wide gains. If more stable prices help induce a supply response, this brings the average level of prices down. In return, low rice prices effectively increase real wages for employees without increasing the nominal wages paid in the industrial and service sectors. In conjunction with other factors, the combination of low nominal and high real wages stimulates job creation and economic growth necessary for sustainable poverty alleviation. On the other hand, uncertain prices slow farmers' supply response, leading to longer periods of lower production and higher foodgrain prices. When rice prices rise, workers in Asian countries, where rice is a major staple, need higher wages to keep real incomes from falling as they pay for more expensive food (Timmer 2004; Dawe and Timmer 2013). As higher nominal wages discourage investments, the end result is often a slowdown in the productivity growth essential for food security and poverty alleviation.

16. The strategic policy question is how to reduce price volatility. This is not a trivial question because many past efforts to stabilize rice prices in Asia have failed to help generate growth and reduce poverty, especially when higher agricultural production was stimulated by artificially high rice prices or when consumers were protected by export restrictions. More stable prices *per se* do not guarantee the realization of economic gains. Success depends on how stability is achieved and the complementary measures taken. If domestic prices are stabilized for long periods of time without taking into account changes in world market prices, domestic prices often end up either at high levels in net importing countries (above import parity) or at very low levels in net exporting countries (below export parity). When this happens, stable prices may actually increase poverty, distort economic decisions, and eventually lower the quality of growth (World Bank 2012b; Warr 2013). Low rice prices discourage agricultural growth and high rice prices discourage consumption (and directly increase poverty). This strong interlinkage between price level and price volatility explains why more stable prices (food stability) at the expense of higher prices (food affordability) or lower prices (food availability) may actually reduce food security.

17. Some price volatility is common to agricultural markets, for example, seasonal volatility. Smoothing out this volatility with short-term measures is not desirable as it requires long-term structural improvements; for example, production spread out more evenly over the year and low marketing costs. Thus, domestic price volatility close to international price volatility can be acceptable, especially given that global rice price volatility is generally lower than that of global wheat and maize prices (Table 1).

Table 1: Volatility of world cereal prices, %⁷

	Wheat	Maize	Rice, Thailand	Rice, Vietnam
2004-2008	7.2	7.5	8.0	5.2
2009-2013	7.6	6.9	4.5	6.1
2004-2013	7.3	7.2	6.5	5.7

Note: Wheat (US), no. 1, hard red winter, ordinary protein, export price delivered at US Gulf ports for prompt or 30-day shipment; Maize (US), no. 2, yellow, free-on-board (FOB) US Gulf ports; Rice (Thailand), 5% broken, white rice, milled, indicative price based on weekly surveys of export transactions, government standard, FOB Bangkok; Rice (Vietnam), 5% broken, FOB Hanoi.

Source: World Bank Pink Sheets.

18. Price volatility above the level observed in reference international markets requires the most attention. Such volatility can be reduced but this requires solid analysis of driving forces of volatility and identification of the best remedies. Direct price stabilization usually leads to price distortions; i.e., low prices in the case of export restrictions or high prices in the case of government-owned stock programs. This is harmful to food security in the long run, suggesting that rice price stability needs to be addressed carefully, mostly through indirect measures.

19. It is important that price stability is not equated with price support to either producers or consumers. Farm support can lead to short-term production benefits but in the long run, more rice production can increase farmers' income and reduce consumers' food expenditures only when rice production is the most beneficial use of land (i.e., farmers are not forced to grow rice instead of another crop) and is accompanied by lower costs of production (through an increase in total factor productivity). The next chapters go systematically through these issues for Myanmar.

⁷ Price volatility is defined as the standard deviation of the logarithm of monthly price returns.

3. Rice Price Levels and Volatility in Myanmar

20. Rice is not a uniform commodity. There are many varieties of rice across Asia.⁸ Myanmar also has many rice varieties, which often not only complicates market monitoring and price stabilization but also makes it difficult to aggregate paddy into uniform lots, control rice quality, ensure efficient milling, and trade at a profit. Two rice varieties for Myanmar are selected as representative *domestic prices* for this report. The first is *Pawsan*, the most popular fine-quality aromatic rice variety, which is marketed from Pathein, Shwebo, and Yangon to all other markets in Myanmar. However, this variety is not widely produced and is relatively thinly traded. The second is *Manawthukha (MWK)*, a lower-quality Letyezin rice of fair eating quality and reasonable price. It is the most preferred variety of middle-class consumers in the country, produced in all paddy growing areas and marketed across all regions in Myanmar. In addition to MWK and Pawsan, there is *Emata*,⁹ which is exported as 25% broken rice. Emata comprises more than 90 percent of Myanmar's rice exports (see Table 5 in World Bank 2014b) and is used in the report as a representative *export price*.

21. The monthly wholesale price time series data used for this report cover the period from January 2004 to December 2013. The price data come from the Market Information System (MIS) of the Ministry of Agriculture and Irrigation (MOAI).¹⁰ Four domestic markets are included in the analysis.¹¹ *Yangon* and *Pathein/Delta* represent rice surplus areas, while *Mandalay* and *Myingyan* represent rice deficit areas. Pathein is located in Ayeyarwady Region; Yangon is the central market located in Yangon Region, which is also the major rice market for domestic and international trade. Mandalay is the focal market in central Myanmar and Myingyan is located in upper Mandalay Region. The wholesale prices of Emata are available only in *Yangon* and they are used to represent the export price.¹²

22. Paddy price data series are limited and thus used for analysis only in Chapter 3. Paddy price data are from the Ministry of Commerce (MOC) and are available for Emata and MWK, but not for Pawsan. These price data cover Pathein and Yangon, but not Mandalay or Myingyan. Time series data for paddy prices are only available from January 2007 to December 2012.

23. The analysis of domestic prices in Myanmar is conducted in both nominal and real terms. The Myanmar consumer price index (CPI) from the International Monetary Fund (IMF) and the Central Statistical Office (CSO) of Myanmar is used to deflate nominal prices into real ones. Unless otherwise indicated, the volatility of prices in Myanmar is presented in real terms (CPI-adjusted) for comparability of volatility over time. Price volatility in this report is defined as the standard deviation of the logarithm of monthly real price returns (Box 1). International price comparisons are made in US dollars (\$), and international price volatility is measured in real local currency units (LCUs). The price data for other countries are from the FAO's Global Information and Early Warning System on Food Security (FAO-GIEWS).

⁸ See World Bank (2014b)'s Annex 2 for a description of the complexity of the world rice market.

⁹ Emata is a grouping of rice varieties based on length-breadth ratio. Other groupings include Ngasein, Letywezín, Medon, and Byat.

¹⁰ Annex 1 presents the price data used for this analysis.

¹¹ There are no price time series data available for other markets and types of rice for the period from January 2004 to December 2013. Unfortunately, there are also no price time series data for the Muse market on the border with China. Information on price volatility on that border is important for understanding price volatility across Myanmar.

¹² The wholesale Emata Yangon price is used in this report as a proxy for export price. The FOB Yangon export prices were available to the team from May 2011 only. In 2012-2013, the average margin between these two prices was \$55 per ton (see Figure 6). Note that actual prices received by exporters may even differ from the reported FOB prices due to the nature of export licensing in Myanmar. The export licenses include information on indicative prices for export transactions, but sometimes traders informally sell rice at different prices depending on the market situation.

Box 1: Alternative Methods for Measuring Price Volatility

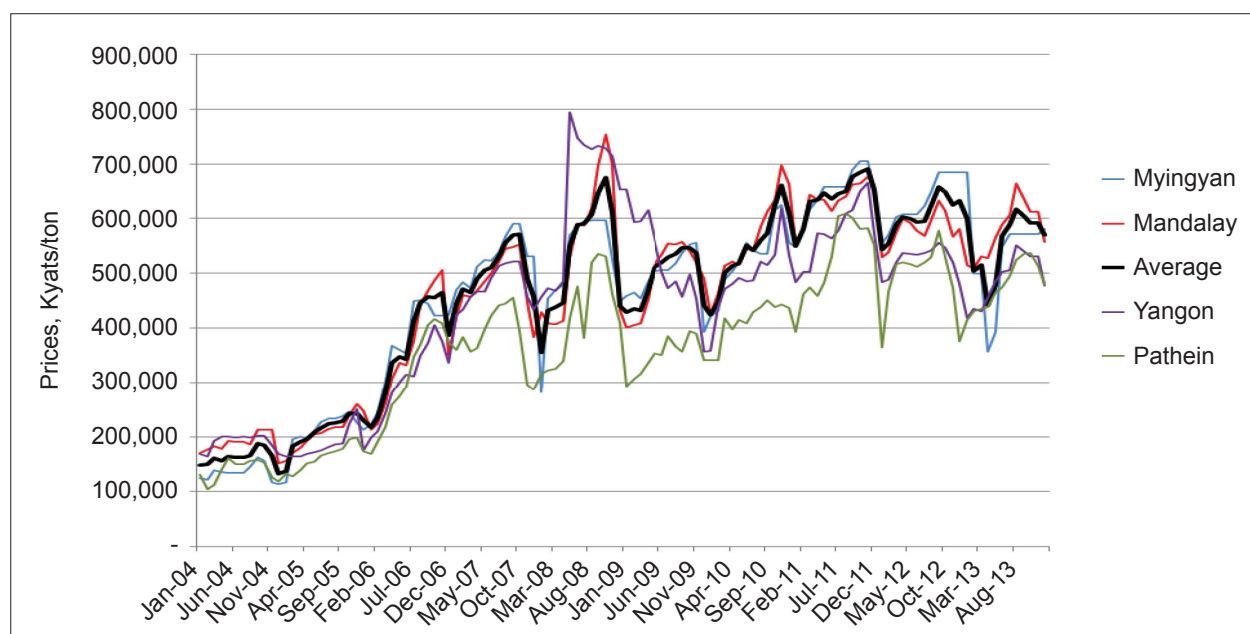
Price volatility can be measured in different ways. One alternative to the indicator used in this report is a *relative price spread*, defined as the difference between maximum and minimum prices divided by the average price. This definition is criticized for using only two price points out of many available observations. The second alternative is a *coefficient of variation*, defined as the ratio of the standard deviation to average prices. Sometimes the coefficient of variation is adjusted by a time trend. The first and second indicators tend to underestimate volatility for higher-value commodities compared to lower-value commodities, making it less suitable for the analysis of low- and higher-value rice carried out in this report.

24. The analysis begins with a review of rice price levels in Myanmar. In nominal terms, the prices of Pawsan rose on all markets in Myanmar over the past 10 years. From January 2004 to December 2013, they doubled in Yangon and more than tripled in Myingyan (Figure 1). Typically, prices were lowest in Pathein, the main producing area, and highest in Myingyan, the main deficit area. Prices in Pathein were also the lowest because farmers there are reported to harvest paddy early with high moisture content (to prepare fields for beans and pulses as a second winter crop) and they often include foreign matter to inflate the weight.

25. Pawsan prices were highly seasonal. They followed a predictable, intra-annual pattern. Every year they dropped between December and February and peaked between August and November. During the observed period, maximum prices in real terms were 40 percent above minimum prices on average.

Figure 1: Myanmar: Nominal prices of Pawsan, Kyats/ton

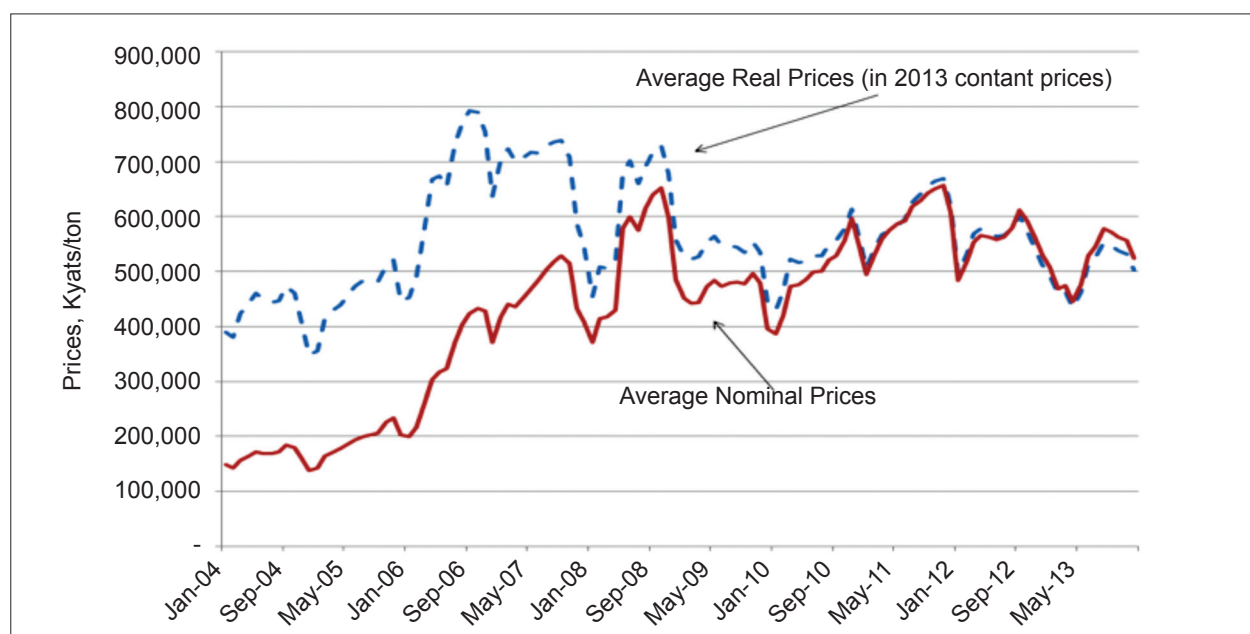
Figure 1: Myanmar: Nominal prices of Pawsan, Kyats/ton



Source: MIS/MOAI (2014).

26. In real terms, the increase in Pawsan prices was much smaller. The simple average price in the four markets increased by 28 percent from January 2004 to December 2013, compared to a 252 percent increase in nominal terms (Figure 2). In the period 2004-2008, real prices increased by 43 percent. However, in the period 2009-2013, they fell by 5 percent. While these are wholesale prices, this suggests that, at least for Pawsan during the past five years, farmers faced constant output prices while production costs, especially labor costs and those of tradable inputs, reportedly grew steadily.

Figure 2: Myanmar: Average nominal and real prices of Pawsan, Kyats/ton



Source: MIS/MOAI (2014), IMF (2014), and CSO (2014).

27. The average volatility of Pawsan prices was 10.5 percent during the observed period (Table 2).¹³ The price volatility was 30 percent higher during 2004-2008 than during 2009-2013. It peaked in 2008 and then subsequently went down. The lowest volatility was observed in Yangon and the highest in Myingyan. Table 2: Myanmar: Average volatility of Pawsan prices, %

Table 2: Myanmar: Average volatility of Pawsan prices, %

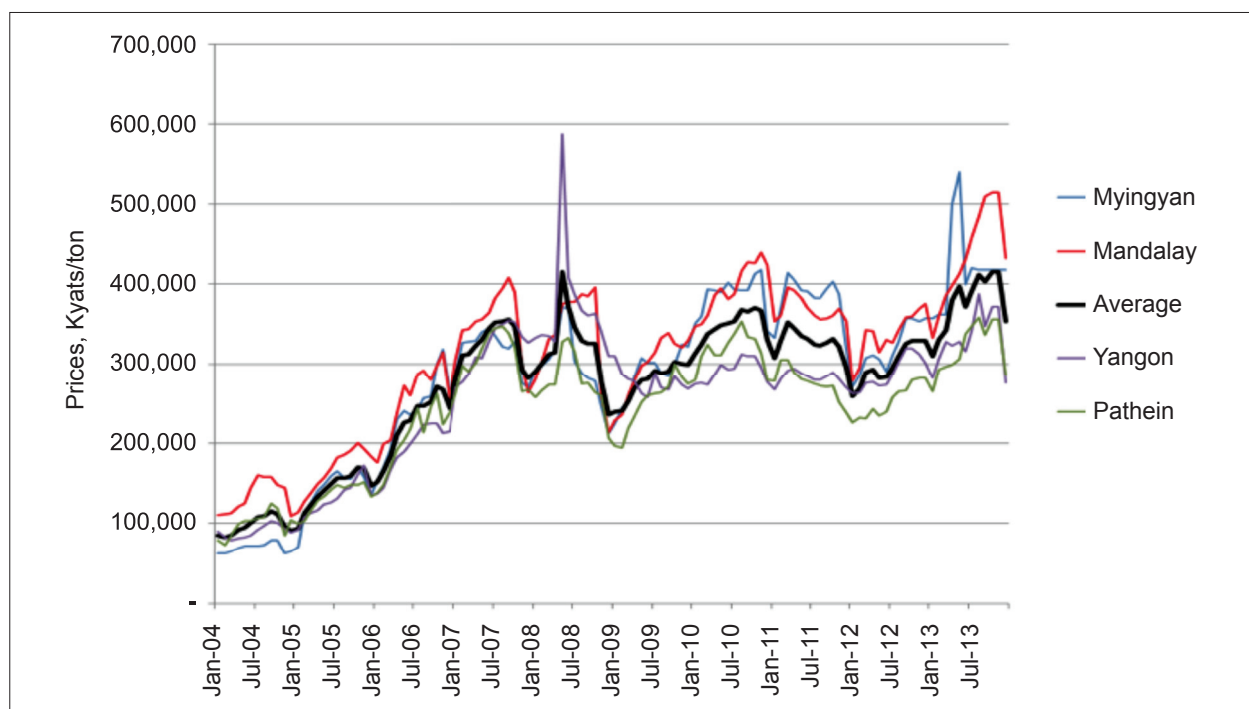
Time periods	Yangon	Pathein	Mandalay	Myingyan	Average for all markets
Jan. 2004-Dec. 2008	10.4	10.8	12.1	15.5	12.2
Jan. 2009-Dec. 2013	7.6	10.3	6.5	9.6	8.5
Jan. 2004-Dec. 2013	9.1	10.5	9.6	12.9	10.5

Source: Authors' estimates based on data from MIS/MOAI (2014).

28. The prices of MWK, the medium-quality rice, were half the level of Pawsan prices. But in nominal terms they increased more than the prices of Pawsan. The MWK prices more than tripled in Yangon, Pathein, and Mandalay and increased six-fold in Myingyan (Figure 3). Similar to Pawsan, the average MWK prices were lowest in Pathein and highest in Myingyan during the observed period.

¹³ Annex 2 presents the tables with price volatility in nominal and real prices in all locations using alternative methods of coefficient of variations and price returns as described in Box 1.

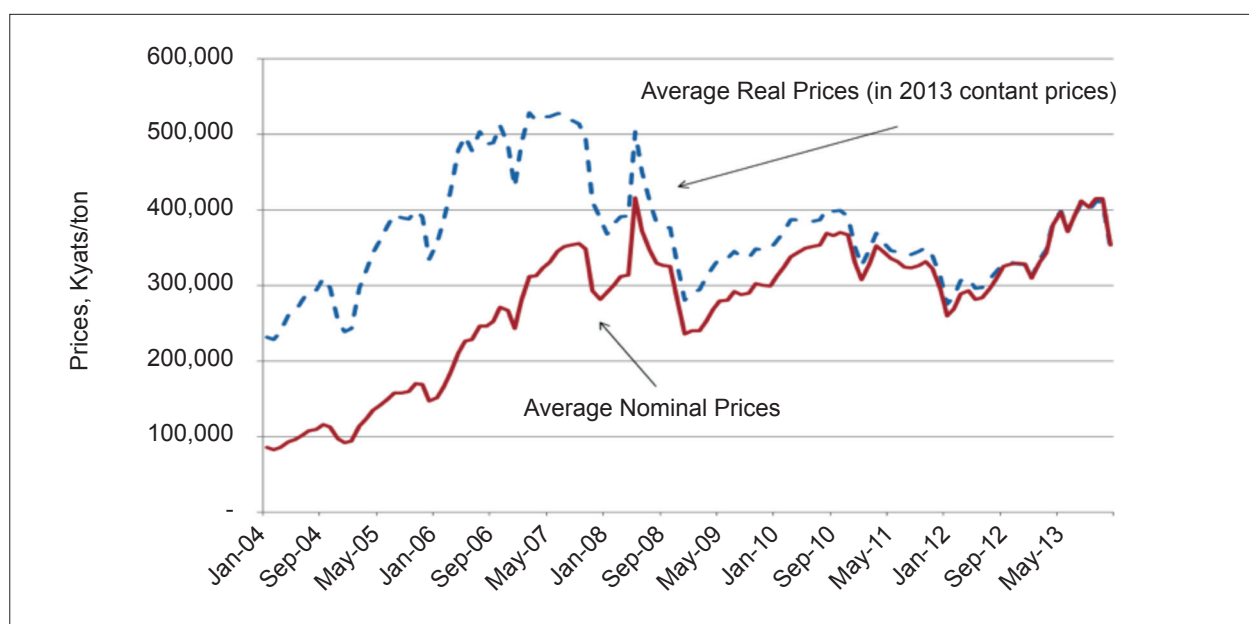
Figure 3: Myanmar: Nominal prices of Manawthukha, Kyats/ton



Source: MIS/MOAI (2014).

29. In real terms, the price increase in MWK was 51 percent from 2004 to 2013. The increase in real MWK prices in both subperiods, 2004-2008 and 2009-2013, was about the same, at 25 percent (Figure 4). Figure 4: Myanmar: Average nominal and real prices of Manawthukha, Kyats/ton

Figure 4: Myanmar: Average nominal and real prices of Manawthukha, Kyats/ton



Source: MIS/MOAI (2014), IMF (2014), and CSO (2014).

30. Similar to Pawsan prices, MWK prices exhibited a seasonal pattern. They tended to drop in December and January and peaked between August and November. During 2004-2013, the ratio of maximum to minimum prices in real terms averaged 35 percent.

31. MWK prices were less volatile than Pawsan prices. This could be due to the wider cultivation of MWK in Myanmar. Between January 2004 and December 2008, the volatility of MWK averaged 10.1 percent, declining to 6.3 percent between January 2009 and December 2013 (Table 3). During the whole observed period (January 2004 to December 2013), the average volatility was 8.8 percent, or 20 percent below the average volatility of Pawsan prices.

Table 3: Myanmar: Average volatility of Manawthukha prices, %

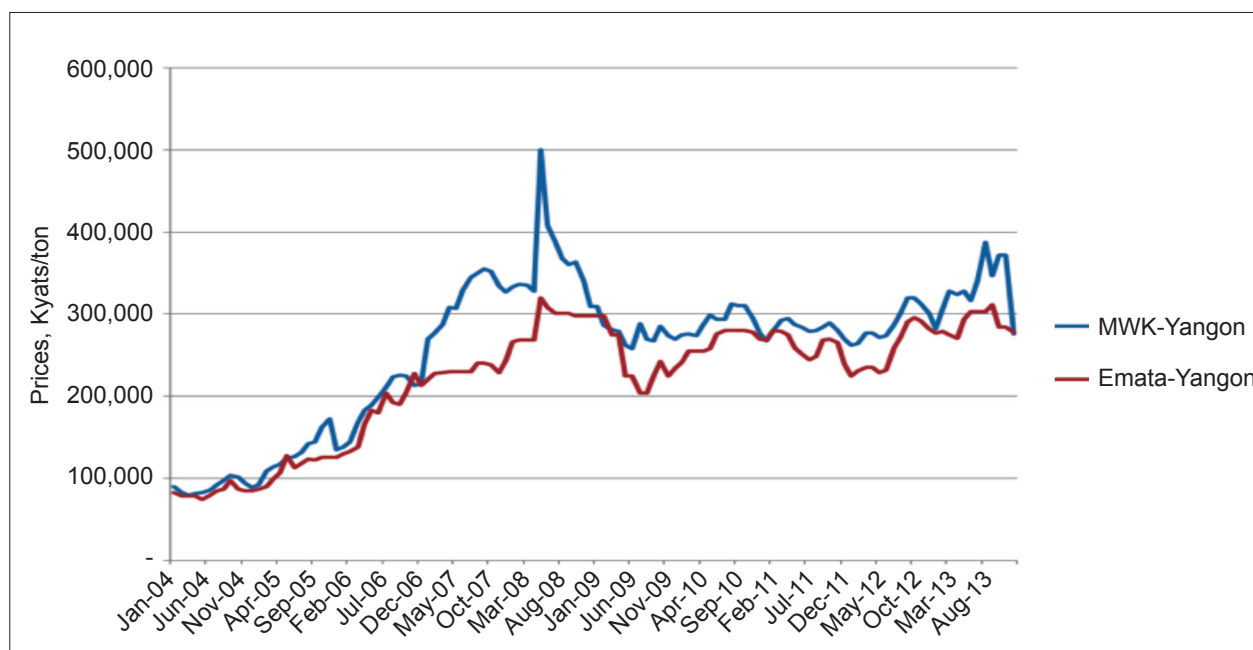
Time periods	Yangon	Pathein	Mandalay	Myingyan	Average for all markets
Jan. 2004-Dec. 2008	11.0	10.2	10.6	10.8	10.6
Jan. 2009-Dec. 2013	5.9	5.7	6.5	8.4	6.7
Jan. 2004-Dec. 2013	8.8	8.2	8.7	9.6	8.8

Source: Authors' estimates based on data from MIS/MOAI (2014).

32. It is worth noting that the price volatility of both Pawsan and MWK rice has decreased over time. This could be a result of more liberal and organized trade during 2009-2013 compared to 2004-2008. While the rice sector liberalization started in 2004, it took many years to replace the system of trade and price controls and few state trading enterprises with the current system of open borders, no price controls, and many private traders. This transition seems to be complete and is reinforced by the absence of local barriers to trade, market-based price mechanisms, support for cross-border trade, especially with China, and promotion of formal exports.

33. The prices of Emata (25% broken), the main rice quality exported, closely followed the prices of MWK. MWK was slightly more expensive than Emata. Between January 2004 and December 2006, the price gap between them was 13,000 Kyats per ton. It surged to 84,000 Kyats per ton in 2007-2008, but starting from January 2009 the nominal gap between these prices stabilized at 30,000 Kyats per ton or about 13 percent during 2011-2013 (Figure 5). The gap was closed in December 2013.

Figure 5: Myanmar: Nominal prices of Emata and Manawthukha in Yangon, Kyats/ton



Source: MIS/MOAI (2014).

34. The price volatility of Emata appears to be lower than the price volatility of comparable rice types in Cambodia, Thailand, and Vietnam, the top regional exporters. Measured in real LCUs, the average volatility of wholesale prices in all countries was lower in 2009-2013 compared to 2004-2008 (Table 4). During 2009-2013, the volatility of Myanmar's Emata was the lowest, at 5.1 percent, compared to the price volatility of similar rice at 6.8 percent in Cambodia, and 6.9 percent in Vietnam, and 8.2 percent in Thailand.

Table 4: Average volatility of low-quality rice in selected countries, %

Time periods	Myanmar, Yangon-Emata	Cambodia, mixed rice	Thailand, 25% broken	Vietnam, 25% broken
Jan. 2004-Dec. 2008	6.0	9.4*	8.7	8.7
Jan. 2009-Dec. 2013	5.1	6.8	8.2	6.9

Note: * From January 2006 to December 2008. For Cambodia, wholesale prices are used due to the lack of the export price time series data for 2004-2013. Thailand and Vietnam prices are export FOB prices.

Source: Authors' estimates based on data from MIS/MOAI (2014), FAO-GIEWS (2014), IMF (2014), and CSO (2014).

35. Among all rice types in Myanmar analyzed in this report, the prices of Emata were the least volatile. They were 57 percent less volatile than MWK and 88 percent less volatile than Pawsan (Table 5). This could be because Emata has been linked to less volatile world market prices, which cannot be said about Pawsan, for example. Pawsan is not yet exported in large quantities and thus Myanmar cannot "import" lower volatility from the world market. It is not even traded domestically in large quantities; of all the reviewed rice varieties, Pawsan is the most exposed to local shocks, which are likely to cause its higher volatility.

Table 5: Myanmar: Average volatility of rice prices by variety, 2004-2013, %

Rice variety	Volatility
Emata	5.6
Manawthukha	8.8
Pawsan	10.5

Source: Authors' estimates based on data from MIS/MOAI (2014), IMF (2014), and CSO (2014).

36. Paddy prices have been more volatile than rice prices. During 2009-2012, paddy price volatility was consistently higher than rice price volatility for all regions (Table 6). For MWK, for example, the difference ranged from 40 percent in Pathein to 110 percent in Yangon. Addressing price volatility in Myanmar would therefore require a high attention to the issues at the farm-gate level.

Table 6: Myanmar: Average volatility of selected paddy and rice prices, 2009-2012, %

	Pathein, MWK	Yangon, MWK	Yangon, Emata
Paddy prices	7.0	7.8	8.3
Rice prices	5.0	3.7	5.4

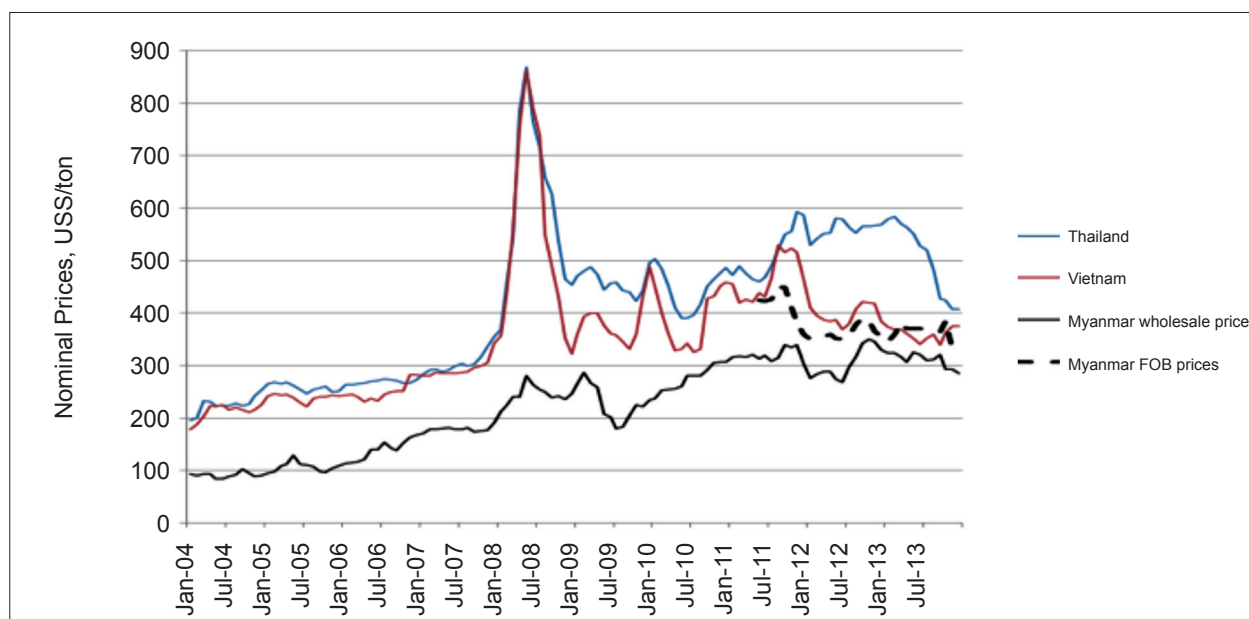
Source: Authors' estimates based on data from MIS/MOAI (2014), MOC (2014), IMF (2014), and CSO (2014).

37. While volatility is a concern, it is also important to consider the increase in rice price levels in Myanmar. During 2011-2013, \$-denominated rice prices from Thailand and Vietnam decreased while those from Myanmar increased (Figure 6), making it potentially difficult for Myanmar to compete if this trend continues. In the second part of 2013, Emata FOB prices even exceeded Vietnamese export prices.¹⁴ If Myanmar improved the quality and reliability of its exports compared to Vietnam, the reduced price differential would not necessarily be a problem and could be viewed as a desirable outcome. However, such improvements do not appear to have taken place in Myanmar yet (World Bank 2014b).

38. The recent increase in domestic prices in Myanmar was larger than that in other regional rice-exporting countries and close to that in rice importing ones, which are not concerned about the competitiveness of their domestic prices. Between January 2009 and December 2013, wholesale Emata prices in Yangon expressed in nominal \$ terms rose by 41 percent, much more than the wholesale prices in the capitals of Cambodia, India, Vietnam, and Thailand (Table 7). The price increase in Myanmar even exceeded the increase in prices in some net importing countries such as Bangladesh and the Philippines. There is little space for further domestic price increases in Myanmar without erosion of its rice price competitiveness unless the quality of rice and reliability of exports are improved. In the summer of 2014, for example, rice exports from Yangon could not compete with cheaper-priced exports from Vietnam and India. The management of price volatility, therefore, requires a careful analysis. The next chapter presents a review of the driving forces of price volatility in Myanmar.

¹⁴ The FOB prices for Emata/Yangon are available only from May 2011 from MOC.

Figure 6: Selected export rice prices, \$/ton



Note: Thailand and Vietnam prices are export prices for 25% broken. Myanmar prices are wholesale and FOB prices for Emata in Yangon, 25% broken.

Source: MIS/MOAI (2014), MOC (2014), and FAO-GIEWS (2014).

Table 7: Rice prices in selected countries, \$/ton

	2009	2010	2011	2012	2013	Increase, 2009-2013
Exporters						
Cambodia	373	439	460	445	437	17%
India	348	420	418	386	396	14%
Myanmar	259	301	345	344	364	41%
Vietnam	384	387	467	397	363	-5%
Thailand	460	444	511	560	504	10%
Importers						
Bangladesh	293	403	409	302	372	27%
China	410	437	561	609	601	46%
Indonesia	476	617	699	749	753	58%
Philippines	593	630	673	713	743	25%

Note: Cambodia price is Phnom Penh, mix rice, wholesale. India price is New Delhi, coarse rice, wholesale. Myanmar price is Yangon, 25% Emata, wholesale. Vietnam price is 25% broken FOB. Thailand price is 25% broken FOB. Bangladesh price is Dhaka, coarse rice, wholesale. China price is Hunan, Indica, first quality. Indonesia price is national average, medium quality, retail. Philippine price is national average, regular milled, wholesale.

Source: FAO-GIEWS (2014).

4. Drivers of Rice Price Volatility in Myanmar

39. There are a number of potential drivers of rice price volatility in Myanmar. Some are *external*, such as the volatility of world market prices. Yet given the low share of rice exports in total production (ranging from 7 to 9 percent depending on the year) and the large share of local production in domestic consumption, most drivers of price volatility are likely to be *internal*. The most significant candidates are: (i) the high concentration of paddy production within a few months; (ii) weak domestic market integration; (iii) poor market transparency; (iv) low private rice stocks; (v) limited export diversification with regard to quality and markets; and (vi) uncertain export policy. These drivers are discussed below in turn.

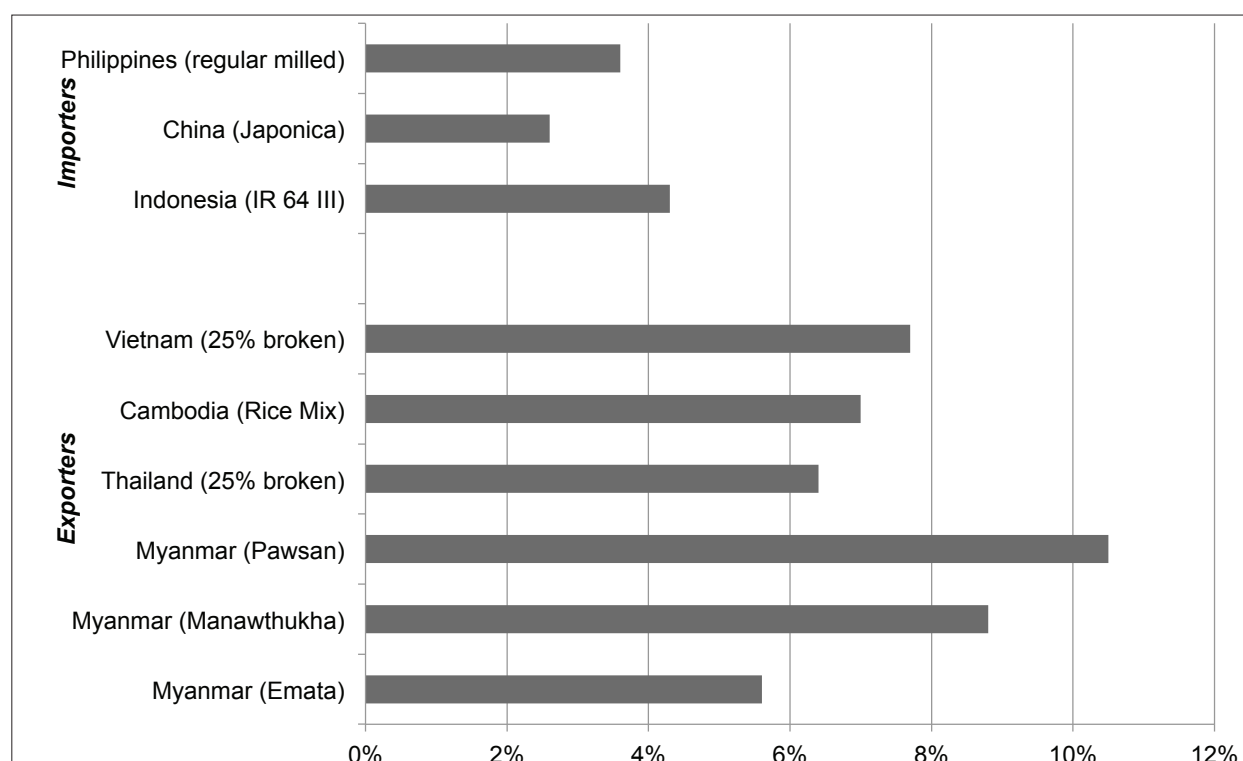
4.1 Volatility of world market prices

40. Due to the nature of the world market for rice, the price volatility of net exporters is higher than that of net importers. The world rice market is thin, segmented, and highly distorted. This is because most large importers such as China, Indonesia, the Philippines, and increasingly African countries insulate domestic markets from the world market through high import tariffs and import monopolies. They pursue rice self-sufficiency policies and import only when domestic prices reach very high levels within a short period of time (i.e., the price elasticity of import demand from the world market is very low). This leads to unpredictable volatility passed through to the world markets, to be absorbed by exporters (top exporters are India, Vietnam, Thailand, Pakistan, and increasingly Cambodia). As a result, the price volatility in net importing countries tends to be much lower than that in net exporting countries (Figure 7).¹⁵

41. Therefore, as a net exporter, Myanmar is bound to face higher price volatility than that observed in net importing countries. In the current situation, its domestic price volatility is actually expected to decrease through the stronger integration of Myanmar with the world trading system. But its domestic price volatility may also increase if world market prices are more volatile in the future. Domestic price volatility will eventually be determined by the interplay between many internal and external factors that could compensate for greater exposure to future world market volatility. Thus, this does not need to stop Myanmar from integrating with the world trading system, which would bring many other economic benefits such as incentives for investing in rice mills and export trading and smoother transmission of price and product quality information between Myanmar rice buyers and producers.

15 The example of India, a net exporter with low volatility, is less relevant to Myanmar because the former is a populous country with an inward-oriented food security and trade policy that generates exports mainly to dispose of excess government stocks, rather than using exports as a vehicle for agricultural growth. This is reflected in India's very small share of exports in domestic production, relative to that in other exporting countries. The current Indian export drive beginning in the fourth quarter of 2011 is an exception, as overseas shipments are principally coming out of the marketplace.

Figure 7: Rice price volatility in selected Asian countries, %



Note: Volatility is measured in real LCU prices. Prices in Myanmar, Philippines, and Thailand are from 2004 to 2013; in Indonesia, from 2004 to 2012; in China, from 2005 to 2013; in Cambodia, from 2006 to 2013; in Vietnam, from 2008 to 2013.

Source: Authors' estimates based on data from FAO-GIEWS (2014) and MIS/MOAI (2014).

42. Future price volatility can particularly decline for Pawson, high-quality rice. The volatility of Pawson prices has been very high, almost twice as high as exported Emata (Table 5). One reason is that Pawson is still hardly exported (see "Fragrant" column in Table 8) and is thus exposed mainly to local supply and demand shocks. During 2004-2013, the average volatility of fragrant rice on world markets (proxied by the Bangkok 100% fragrant FOB price) was only 5.1 percent or almost half of the price volatility of Pawson. For the Pawson variety, therefore, the strategy for reducing price volatility could be stronger integration with the world trading system.

Table 8: Myanmar: Formal rice exports by grade, '000 tons

	Fragrant	100% S	5%	10%	15%	Parboiled	25%	Brokens	Other	Total
2010	*	2	12	9	5	0	456	0	*	485
2011	*	5	20	1	12	1	737	39	1	816
2012	*	1	53	0	6	8	504	30	2	605

Note: * Less than 500 tons. Non-fragrant rice is mainly Emata varieties. Rice 15% brokens means 85% head rice and 15% brokens rice, and so on. The category "Brokens" does not include any head rice.

Source: Slayton & Associates.

43. To a lesser extent, volatility can also decline for MWK prices. MWK prices were more volatile than both the price of Emata (which is exported) and world market prices. With more integration with world markets, MWK price volatility could decline in the future.

44. The price transmission analysis carried out for this report shows that integration of the Yangon market of Emata and MWK with the world market, proxied by the Vietnam 25% broken prices, was apparently non-existent during 2004-2013.¹⁶ Table 9 shows the parameters of price adjustments: α_1 for an adjustment in Vietnamese prices to changes in Yangon prices and α_2 for an adjustment of Yangon prices to changes of Vietnamese prices. There was no significant adjustment in Yangon prices of either Emata or MWK¹⁷ to the changes in Vietnamese prices during the observed period. On the other hand, Vietnamese prices reacted to changes in Yangon prices. On average, it took 6-7 months for Vietnam (with $\alpha_1=0.14$) to restore half of the price deviation from equilibrium of the price relation with Myanmar.

Table 9: Estimates of the adjustment parameters between Yangon and Vietnam prices

Market pairs	2004-2013	
	α_1	α_2
Manawthukha		
Vietnam-Yangon	-0.16***	-0.03
Emata		
Vietnam-Yangon	-0.14***	0.00

Note: Asterisks indicate significance levels: *** 0.001 (strongest), ** 0.01, * 0.05, and non-existent (weakest).

Source: Authors' estimates based on data from MIS/MOAI (2014) and FAO-GIEWS (2014).

45. The elasticity of price transmission (PT) between Yangon and Vietnam markets averaged 0.51. This indicates how much Vietnam prices changed between 2004 and 2013 when Yangon prices either increased or decreased. This elasticity is small compared to those of Myanmar's exporting peers (Box 2). Rice-exporting countries usually have a higher elasticity than rice-importing countries. This low PT elasticity indicates that price volatility in Myanmar has so far been driven mainly by domestic factors.

Box 2: Examples of Price Transmission Elasticities in Asia

The PT elasticity for net rice exporters is often close to one. Gilbert and Moran (2010) found the elasticity of transmitting Thai to Vietnamese prices to be 0.821. This means that a 10 percent change in Thai prices leads to an 8.2 percent change in Vietnamese prices. For net rice importers, PT elasticity is usually lower as these countries protect domestic markets by tariff and non-tariff barriers. During 1990-2010, the average PT elasticity in Philippines was 0.23, while Indonesian rice prices were not integrated with world market prices at all (Ghoshray 2011). A World Bank study on PT elasticity in global markets estimated that the long-term PT elasticity for rice in Asia ranged from 53 percent using FAO GIEWS prices to 60 percent using meta-analysis based on the literature (Greb et al. 2012).

46. Therefore, stronger integration of Myanmar's markets with world markets could eventually reduce domestic price volatility. But domestic price volatility is unlikely to decline below the prevailing volatility in the world market. That volatility would need to be accepted and tolerated in Myanmar to maintain export competitiveness and sustain the country's long-term food security.

¹⁶ Annex 3 presents the methodology and more detailed results of the market integration in Myanmar. It should be noted that the quality of data in Myanmar is very poor and these price data are not an exception. The results of the analysis, therefore, need to be interpreted with care.

¹⁷ The MWK prices are used in the analysis of international price integration due to their close link with Emata.

4.2 High seasonality of paddy production in Myanmar

46. The volatility of both rice prices in Myanmar has a strong seasonal nature. Between 2004 and 2008, the highest MWK prices in real terms were 40 percent larger on average than the lowest prices. Between 2009 and 2013, the ratio of maximum to minimum real prices declined to 1.29. The ratio was lowest in Yangon and highest in Myingyan (Table 10). Prices were usually lowest in December and January in all markets and highest between August and November, depending on the market.

Table 10: Myanmar: Ratio of maximum and minimum real prices, Manawthukha rice

	Yangon	Pathein	Mandalay	Myingyan
Jan. 2004 – Dec. 2008	1.29	1.41	1.44	1.53
Jan. 2009 – Dec. 2013	1.20	1.31	1.30	1.34
Jan. 2004 – Dec. 2013	1.24	1.36	1.37	1.44

Source: Authors' estimates based on data from MIS/MOAI (MIS/MOAI 2014), IMF (2014) and CSO (2014).

48. The average difference between trough and peak wholesale prices (as measured by seasonal factors) is higher in Yangon than in several other major Asian cities (Figure 8). However, domestically the seasonality of prices is lowest in Yangon. The seasonality of rice prices is much stronger in Pathein, Mandalay, and Myingyan, especially reflected in the depth of the trough, when farmers without storage capacity must sell their harvest (Figure 9). This implies very high seasonal price volatility in Myanmar.

49. Because many factors other than seasonality impact prices, there is also volatility in the magnitude of the price rise from year to year. For example, while prices typically rise substantially from January to March, that is not the case every year in every market. If farmers decide to hold their production for sale later in the year, the price rise may not compensate them for the storage costs incurred.

Figure 8: Seasonality of real rice prices in selected countries

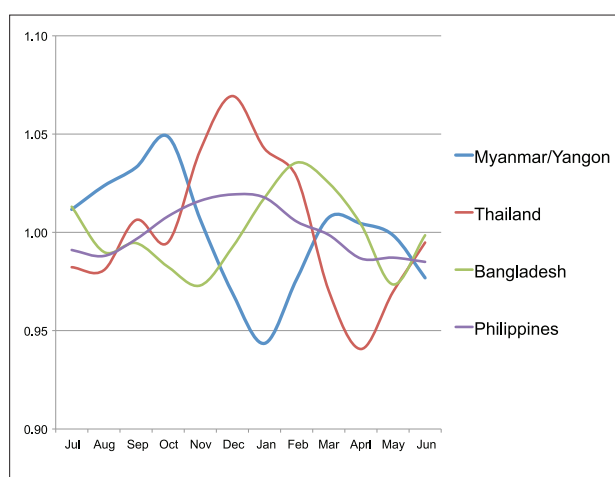
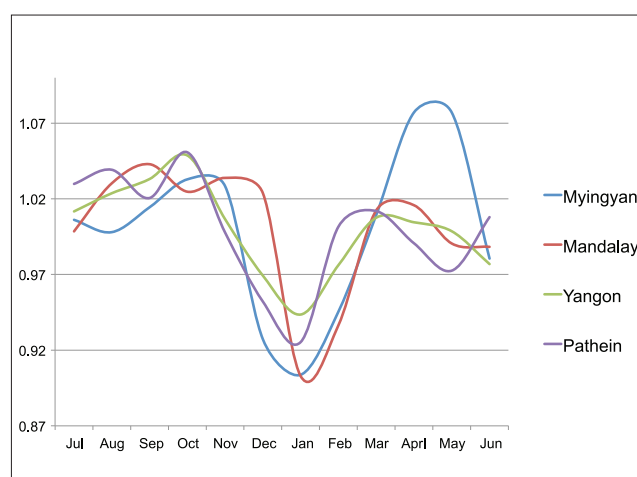


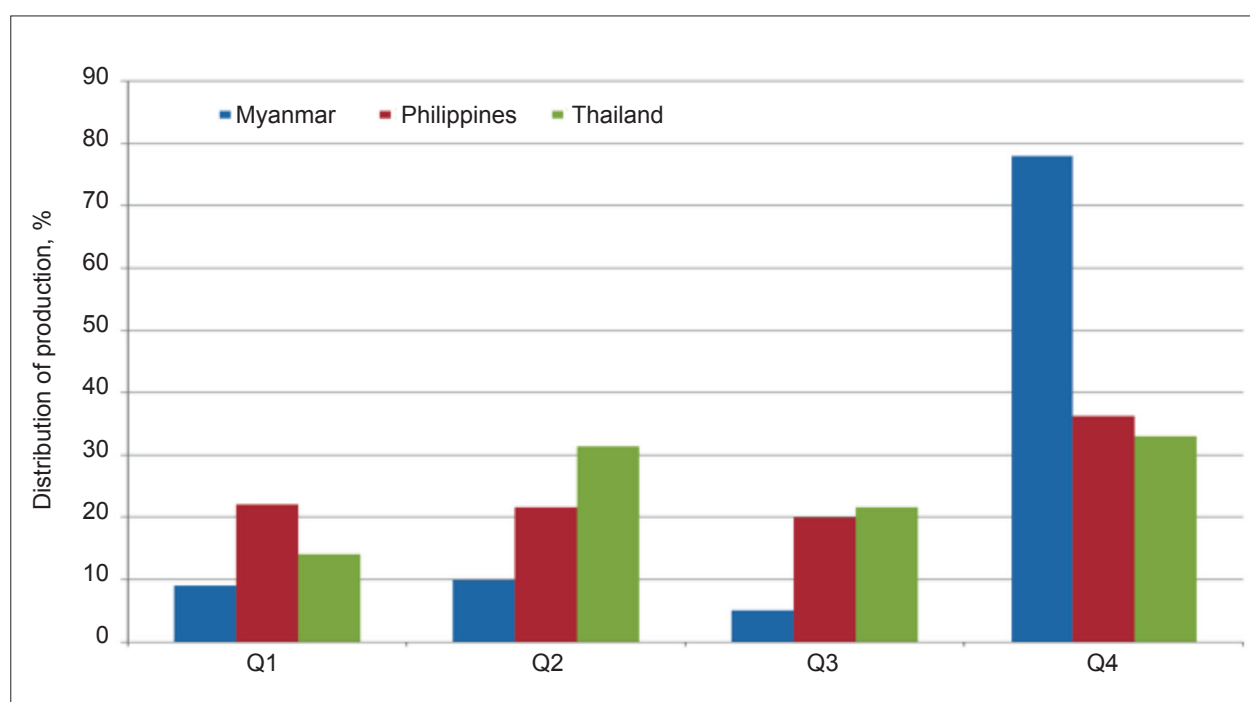
Figure 9: Myanmar: Seasonality of real rice prices



Source: Authors' presentation based on data from FAO-GIEWS (2014) and MIS/MOAI (2014).

50. A main driver of seasonal price volatility appears to be the very high concentration of paddy harvest in the last quarter of the year. Most rice varieties in Myanmar have long durations. Due to this and the lack of efficient irrigation,¹⁸ more than 70 percent of paddy is produced in just two months – November and December (Figure 10). The dry season crop, which accounts for 8 percent of the total harvest, is so minor that its peak harvest (March-April in the Delta region, and the beginning of July in the Central Dry Zone) has a modest impact on prices. The lack of plantings with varieties of different durations prevents farmers from spreading the harvest more evenly over time, putting significant downward pressure on paddy prices during the main harvest.

Figure 10: Paddy production by month in selected countries, %



Note: Data for Myanmar are the average of 2003-2007. Data for Philippines and Thailand are the average of 2008-2012.

Source: ASEAN Food Security Information System and FAO.

51. Harvests in other countries tend to be spread more evenly over the year as plantings of non-photoperiod-sensitive varieties predominate and more irrigation is available. In the Philippines, as with Thailand's non-glutinous rice, paddy production is much more evenly distributed (Figure 10). In the Philippines, for example, 23 percent of paddy is produced in the first quarter of the year, 21 percent in the second quarter, 20 percent in the third quarter, and 37 percent in the fourth quarter. In Bangladesh, due to the availability of seeds with different durations and access to irrigation, the dominant *boro* crop accounts for only 60 percent of total rice production (the average for 2006/07-2008/09).¹⁹ Vietnam's dominant crop, the winter-spring harvest, accounts for 50 percent of the total crop, spreading from March to May. The summer-winter harvest accounts for 28 percent and the 10th Month (*mua*) harvest accounts for 24 percent.

52. Thus, to reduce seasonal price movements in Myanmar, the best remedies are better availability of non-photoperiod-sensitive rice varieties with different growth durations to fit different cropping systems; improved irrigation systems; and enhanced farm advisory services assisting farmers to adopt new technologies and better market their produce.

¹⁸ About 23 percent of paddy land in Myanmar is classified as irrigated, according to MOAI. Yet in the irrigation sites visited by the World Bank in 2013 and 2014, only 30-40 percent of these areas had well-functioning irrigation coverage in the dry season.

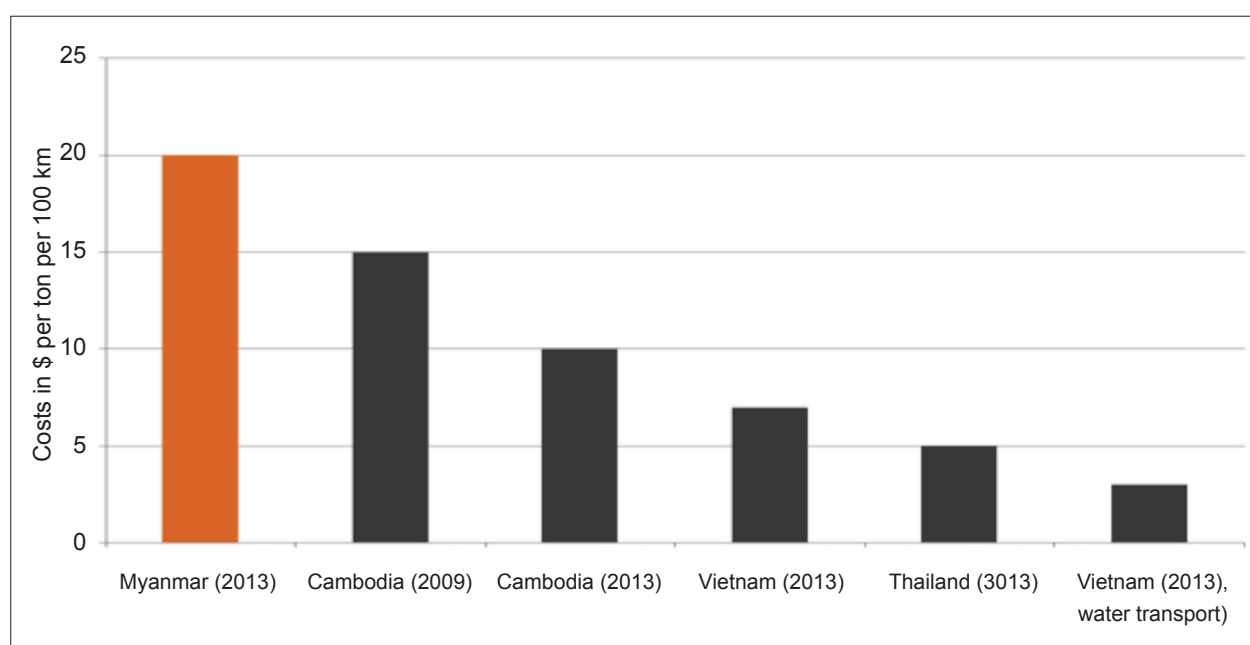
¹⁹ Quarterly production data for Bangladesh and Vietnam were not available to the team, so these countries are not shown in Figure 10.

4.3 Weak domestic market integration

53. Strong market integration ensures that price signals quickly reach more producers to inform their production and marketing decisions, thereby increasing the responsiveness of the food system to price changes. By linking farmers more closely with consumers, marketing systems also better transmit signals to farmers on new market opportunities and guide their production choices to meet consumers' preferences at competitive prices. Thus, stronger market integration helps reduce price volatility and increases the efficiency of markets.

54. As discussed below and detailed in Annex 2, domestic market integration in Myanmar appears to be weak. The transmission of price signals between surplus and deficit regions is slow due to many factors, including the existence of many local varieties that lead to rice market segmentation (Box 3), poor market transparency (see Chapter 4.4), poor quality of rural infrastructure (and thus high transport costs; see Figure 11), inadequate transportation services, and weak phone connectivity. Myanmar has the lowest road density in Southeast Asia, with 40 kilometers per 1,000 square kilometers: this is 50 percent lower than that of Lao PDR, which has the second lowest road density in the region. Furthermore, only 40 percent of main roads and 13 percent of rural roads are paved to all weather standards (ADB 2012). Its road transport costs have recently increased due to compliance with ASEAN transportation rules. Myanmar's rural cell phone penetration is only 4 percent (see Table 90 in LIFT 2012). This stands in sharp contrast to the rest of Southeast Asia, where penetration is close to 100 percent.

Figure 11: Transport costs in selected countries, \$ per ton per 100 km



Source: World Bank (2014a) and World Bank (2014b).

55. The price integration of domestic market pairs is stronger than the integration with world markets, but is still relatively weak. For Pawsan, only Patheingyi and Myingyan markets seem to be strongly integrated, with price changes in one market reflected in other markets (Table 11). Partial price adjustments are also observed in the Mandalay market.

Table 11: Myanmar: Estimates of the adjustment parameters of Pawsan prices, 2004-2013

Market pairs	α_1	α_2
Yangon-Pathein	0.00	0.09*
Yangon-Mandalay	-0.07	0.11
Yangon-Myingyan	-0.09	0.12
Pathein-Mandalay	-0.17	0.27**
Pathein-Myingyan	-0.23***	0.24**
Mandalay-Myingyan	-0.28***	0.13

Note: Asterisks indicate significance levels: *** 0.001 (strongest), ** 0.01, * 0.05, and non-existent (weakest).

Source: Authors' estimates using the MIS/MOAI prices (2014).

56. For MWK, only Mandalay and Myingyan markets are clearly integrated (Table 12). Other markets displayed a variable degree of integration. Prices in Yangon react only to prices in Myingyan but not to prices in Pathein or Mandalay, a strange result given the closer distance between these markets and Yangon. Prices in Pathein adjust to changes in prices in Mandalay, and Mandalay prices react to changes in prices in Myingyan, but cross-market PT remains weak.

Table 12: Myanmar: Estimates of the adjustment parameters of Manawthukha prices, 2004-2013

Market pairs	α_1	α_2
Yangon-Pathein	-0.09	0.11
Yangon-Mandalay	-0.02	0.12
Yangon-Myingyan	-0.15***	-0.07
Pathein-Mandalay	-0.07	0.39***
Pathein-Myingyan	-0.29***	-0.08
Mandalay-Myingyan	-0.34***	-0.18*

Note: Asterisks indicate significance levels: *** 0.001 (strongest), ** 0.01, * 0.05, and non-existent (weakest).

Source: Authors' estimates using the MIS/MOAI prices (2014).

57. This weak market integration slows spatial arbitrage and may lead to higher price fluctuations. When prices rise in rice deficit markets such as Mandalay and Myingyan, farmers and traders in Yangon and Pathein are not immediately aware of this increase or are unable to ship rice to those markets quickly. The delays in the movement of rice from surplus to deficit areas leads to excessive price volatility even when there is sufficient rice availability in surplus areas. The weak domestic market integration also makes price stabilization difficult. If the government decides to stabilize prices in Mandalay, for example by releasing stocks, there is no guarantee that more stable prices in Mandalay will automatically stabilize prices in other markets. This needs to be borne in mind when addressing price volatility in Myanmar.

58. Going forward, stronger domestic market integration is vital for reducing domestic price volatility. The best ways to improve domestic market integration are by promoting more uniform seed varieties to reduce market segmentation, increasing the density of rural roads, especially all-weather roads, promoting the development of efficient transport services, and by implementing policy changes that facilitate the development of a competitive mobile phone network.

Box 3: Rice Market Segmentation in Myanmar

In Myanmar, overabundance of varieties complicates aggregation along the value chain. It reduces the quality of consignments and ultimately increases market segmentation. The Beale classification system, established in 1927 and still in existence today, groups rice varieties based on paddy length and ratio of length and breadth. The categories are Emata, Ngasein, Letywezin, Meedon, and Byat. Most international traders, however, are only familiar with the first two groups – Emata and Ngasein. While there has been a narrowing of the number of varieties in the intervening period of the last three-quarters of the century, 250 varieties with plant characteristics are recorded by the seed division of MOAI, and 1,074 varieties listed just by name, grain type, and location are regarded as local varieties. This high rice market segmentation contributes to the weak market integration.

Source: World Bank 2014a.

4.4 Poor market transparency

59. Timely provision of accurate market information is an important lubricant for the smooth functioning of agricultural markets. It is well recognized around the world that public access to timely and accurate agricultural outlooks and other market information such as prices reduces market uncertainty. On the other hand, poor market information increases uncertainty and ignites volatility. Poor market transparency was among the major factors of the global foodgrain price spikes in 2008 and 2010 (World Bank 2012a). Accurate information on production, consumption, exports, prices, and stocks is therefore very important to mitigate price volatility and inform policy decisions.

60. Yet the reliability and timeliness of such information is very poor in Myanmar compared to its peers in Southeast Asia. This makes its market integration weaker and price volatility excessive. Myanmar does not have a rice supply-demand balance trusted by market participants. The government neither produces nor publishes commodity forecasts, and the information on different parts of the rice supply-demand balance from various sources is conflicting (Table 13). The MOAI reports only paddy production, rice consumption, and export figures. The MOC reports official rice exports, which account for only half of total exports as described in Chapter 4.6 below. The commodity balance produced by FAS-USDA is publicly available and the most complete, but even that information requires further improvement.

61. The largest unknown is paddy production. According to MOAI, the country produced 31.5 million tons of paddy in 2011/12 (Table 14). The FAS-USDA's alternative estimate is 17.9 million tons, or about half of the official estimate. USDA's production figures are based on periodic travels to the key production areas where interviews are conducted with both farmers and millers. Price changes are also taken into account in arriving at USDA's production estimates. Official wet season acreage figures are accepted as part of its calculations, but it comes up with its own estimates of plantings of the much smaller dry season crop. It is important to note that domestic and foreign analysts who have examined the two series find the USDA figures to be a closer fit with reality.

Table 13: Myanmar: Rice balance data from different sources, 2011/12, '000 tons

	MOAI	MOC	USDA
Area harvested ('000 ha)	8,000		7,030
Beginning stocks	n/a		485
Paddy production	32,064		17,927
Milled production	19,328		11,473
Exports	707	821	1,357
Domestic consumption and residual	11,675		10,200
Ending stocks	~7,000		401
Yield (tons of paddy per ha)	3.83		2.55

Source: MOAI, MOC, and FAS-USDA (2014).

62. Estimates of rice consumption also vary widely. In 2011/12, the total population of Myanmar was estimated at 64 million. Using the data from MOAI in Table 13, per capita rice consumption was 182 kg. Using the FAS-USDA data, per capita consumption was lower, at 159 kg. This difference is equivalent to 1.5 million tons, more than the total exports in 2011/12. According to the World Bank, per capita rice consumption is even lower: average rice consumption in 2010 was found to be 145 kg per capita, with 117 kg in urban areas and 155 kg in rural areas (World Bank 2014c). Compared to the MOAI estimate, actual total consumption could have been 2.4 million tons smaller. Using the provisional results of the 2014 population census, which estimate the total population of Myanmar at 51.4 million, makes the total rice consumption even smaller: 9.4 million tons using MOAI's per capita rice consumption data and 7.5 million tons using World Bank data. This very large margin of error adds uncertainty to the market. The lack of reliable official production and stock data handicaps governmental efforts to implement any rice export policy that seeks to maximize domestic price stability while increasing farm incomes and improving food security.

Table 14: Myanmar: Paddy production, million tons

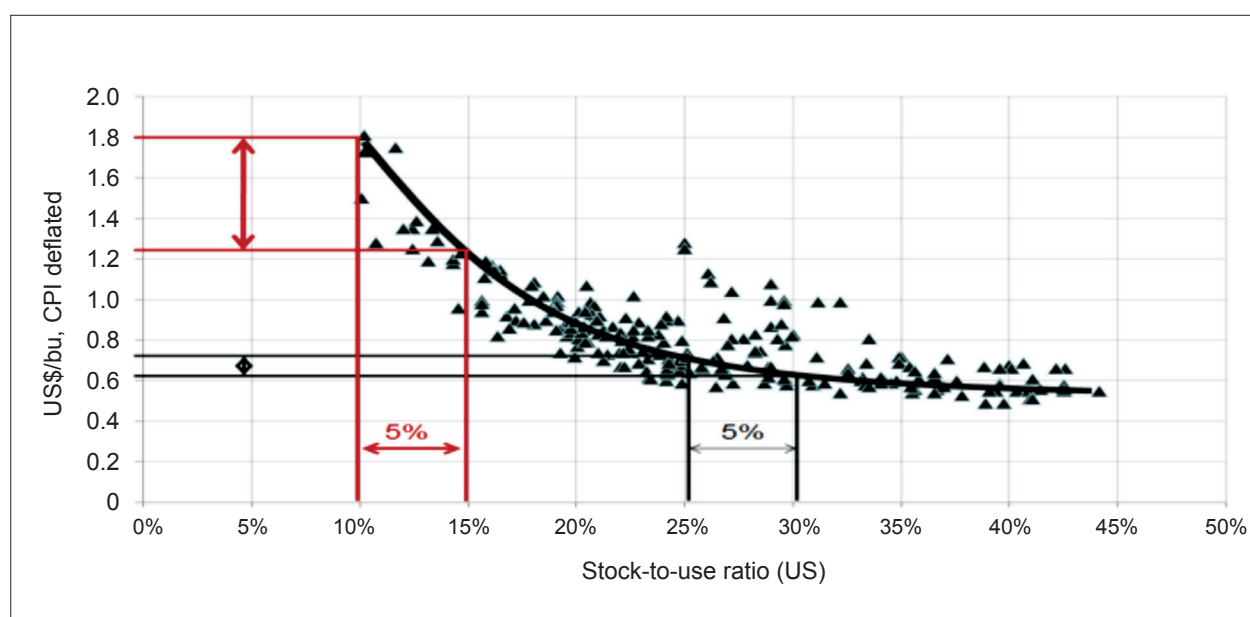
Period	Official Data	USDA Data	Difference	% Difference
Avg '75-76/'79-80	9.79	9.79	0.00	0
Avg '80-81/'84-85	14.08	11.05	3.03	27
Avg '85-86/'89-90	13.81	12.14	1.67	14
Avg '90-91/'94-95	15.40	14.20	1.20	8
Avg '95-96/'99-00	17.90	16.17	1.73	11
Avg '00-01-'04-05	22.59	18.03	4.55	25
Avg '05-06/'09-10	31.06	18.09	12.97	72
2008-09	32.57	17.50	15.07	86
2009-10	32.68	18.19	14.49	80
2010-11	32.58	17.28	15.30	88
2011-12	31.50	17.93	13.57	76

Source: FAOSTAT (2014) and FAS-USDA (2014).

4.5 Uncertainty over private rice stocks

63. The large uncertainty over production and consumption discussed above makes it difficult to estimate ending stocks, yet rice stocks are crucial for understanding and acting on price volatility. When stocks are large relative to consumption (use), prices are usually less volatile in anticipation of possible stock release. But when stocks are low, particularly private stocks, food prices are often more volatile (World Bank 2012a). Gouel and Jean (2012) provide a theoretical framework for the large role played by stocks and trade in determining food price volatility. Figure 12 illustrates this relationship between stocks and price volatility using the US wheat market as an example. When the stock-to-use ratio is large, a 5 percent reduction in stocks leads to a small increase in prices compared to the price increase due to stock's reduction when the stock-to-use ratio is low.

Figure 12: US: Wheat stocks-to-use ratio and real prices, Jan. 1990-Aug. 2009



Source: Cafiero and Schmidhuber (2011).

64. Based on the MOAI data, derived from Table 13, ending stocks in Myanmar are estimated at 7 million tons or 60 percent of the stock-to-use ratio, a very large amount that is not consistent with high domestic price volatility. The USDA's more modest estimate of ending stocks (0.4 million tons or 4 percent of the stock-to-use ratio) is a better reflection of the actual situation (low stocks and high price volatility). It is observed in many countries and globally that when the stock-to-use ratio goes below 15 percent, prices become highly volatile, which is more consistent with the current situation in Myanmar.

65. Higher private stocks would help reduce rice price volatility. More profitability and predictability for rice mills and traders would be instrumental in increasing private stocks. The best ways to increase rice stocks in Myanmar would be through: increasing market transparency; committing to open trade policy; improving access to working and investment capital to rice mills and traders, including through the promotion of foreign direct investment; allowing foreign direct investments in the existing rice mills ("brown" projects), not just in new ("green") projects; and undertaking reforms that could reduce capital interest rates (to lower storage costs). These measures would stimulate more storage and reduce price volatility.

4.6 Low diversification of exports

66. In addition to exporting mainly low-quality non-fragrant rice (recall Table 8), the geographic diversification of Myanmar's exports remains limited. There are essentially two big buyers – African countries for official exports (Table 15) and China for unofficial cross-border exports (Table 16). The price volatility of formal exports appears to be low as discussed in Chapter 3. The largest source of unpredictability and the consequently harmful volatility seems to be emanating from the cross-border trade with China.

Table 15: Myanmar: Formal rice exports by destination, 2005-2012, '000 tons

Destination	2005-09 average	2008	2009	2010	2011	2012
EU	*	*	*	0	12	28
Former Soviet Union	*	0	2	11	19	44
Africa	261	196	899	318	506	460
Asia	129	403	150	156	276	72
Total	391	598	1,052	485	816	605

Note: * Less than 500 tons. *Source:* Slayton & Associates.

67. The border trade is not officially recognized by China. Thus, Myanmar's exports to China are unofficial. This trade offers many opportunities. Chinese buyers are described as not choosy, with an estimated 70 percent of the rice bought in Myanmar being 25% broken. Only 10 percent of the rice is 5% broken and the remaining balance comprises broken and glutinous rice. By trading informally, Myanmar can also bypass the import tariff rate quota and compliance with sanitary and phytosanitary rules (World Bank 2014b).

Table 16: Myanmar: Exports via border trade, 2009-2013, '000 tons

	China	Thailand	Total
2009/10	68	11	79
2010/11	0	0	0
2011/12	136	0	136
2012/13	752	8	760

Source: MOC (various documents).

68. But informal trade brings uncertainty and volatility. Reportedly, there are some 200 traders involved in Myanmar, but only about 10 Chinese buyers. Trucks with rice are reported to have been periodically seized by Chinese customs officials before they reach Ruili (4 km from Muse across the border), which could be part of the negotiating tactics of the Chinese buyers. More and more Myanmar traders complain about this uncertainty and the risks of trading over the border.

69. Neighboring Cambodia has managed to improve quality and diversify its rice exports in a very short time, and Myanmar can learn from Cambodia's experience. Cambodia's rice exports increased from 12,600 tons in 2009 to 378,850 tons in 2013, with more than half of that going to the European Union (EU) under the Everything but Arms Agreement (World Bank 2014a). From being a small exporter of low-quality rice, Cambodia has emerged as a reliable exporter of high-quality aromatic rice, able to meet the stringent food safety requirements of developed countries. Cambodia has also increased its export of paddy to Vietnam and Thailand, from 1.4 million tons in milled equivalent in 2011 to 1.6 million in 2013, pragmatically using the lower milling and logistical costs across the border to the benefit of its farmers. High attention to quality and diversification has paid off, and the next generation of reforms is now focusing on improving rice

mills' access to finance (particularly via a system of warehouse receipts), further reducing export processing costs, and investing in energy and transport infrastructure, all of which will help sustain this success, and all of which are also necessary in Myanmar.

4.7 Uncertainty over export policy

70. Although many barriers to exports were recently abolished in Myanmar, the private sector remains cautious given the potentially conflicting objectives of rice export promotion and price stabilization. This significantly increases uncertainty for millers and traders. Having been previously coerced to sell stocks at a loss, millers and traders remain cautious when domestic prices show a sustained increase. At the same time, international buyers are wary about whether the government will allow its purchases to be executed.

71. Currently, there are no formal export restrictions. But when domestic prices rise to high levels, there is always a risk of exports being temporarily restricted. The most recent export bans were in (i) 2004, after only a little more than half of the licensed exports of 0.5 million tons had been executed; (ii) 2008, when the government signaled that it would allow about 0.4 million tons of rice to be exported by 22 private companies but suspended their licenses after cyclone Nagris hit; (iii) 2011, when exports were limited in the lead-up to the 2011 election; and (iv) 2013, when an informal agreement with millers and exporters was reached to release stocks and restrict exports.

72. On one hand, export bans or even the risk of imposing them may have helped reduce the price volatility of exported rice. As shown in Table 5, the price volatility of Emata (which is exported) was lower than the volatility of Pawsan and MWK, domestically consumed rice varieties. On the other hand, lower volatility of export prices does not seem to be passed through to the prices of locally-consumed rice. High domestic price volatility has prevailed in spite of the reduction in the volatility of export prices.

73. While helping to contain some short-term price volatility of export prices, export bans harm farmers, millers, and traders, especially when they are applied in an *ad hoc* manner. They increase uncertainty and tend to push down average farm prices, thus reducing long-term food availability, an important precondition for food security. Export bans also slow down modernization of the milling and trade sectors, resulting in inefficient logistics and thus a sector that is unable to mitigate large drops in paddy prices after the harvest. More rapid paddy milling and rice exporting could have partially mitigated these price drops, but the rice industry in Myanmar is not currently positioned to accelerate the movement of rice from fields to local and world markets (World Bank 2014b). Export bans would further hamper structural transformation.

74. International experience shows that targeted protection of the poor through safety nets can be a better alternative to mitigate the impacts of price spikes. This is because such a policy intervention does not create uncertainty for rice exporters and traders. If Myanmar is perceived as an unreliable exporter because of frequent bans, this will lower export prices and push down the prices received by farmers. In the long run, therefore, export bans and other restrictions²⁰ yield more costs than benefits and thus need to be avoided.

²⁰ A variable export tax is often considered a market-friendly alternative to export bans. In theory, a variable export tax follows world market prices up and down, helping to stabilize prices without completely stopping trade. In practice, effective operation of such a variable tax for rice requires strong market monitoring capacity and protection of the tax rate-setting mechanism from political influence to avoid prohibitively high rates that would effectively turn the tax into a ban. Due to these reasons, variable export taxes for rice are rarely used in Asia.

5. International Experience from Management of Rice Price Volatility

75. Most Asian countries highly value rice price stability. Price stability is considered a public “good”. But the international experience suggests that not all instability or volatility is “bad”. Stable prices do not mean fixed prices. Full price stabilization for agricultural products is neither achievable nor desirable. Seasonal and spatial price movements are common for agriculture, as they are the key to fostering arbitrage between surplus and deficit regions and they underline seasonal storage and trade decisions. But countries often put more emphasis on price stability than on price levels and food affordability (i.e., other elements of food security), which results in the loss of competitiveness, food insecurity, and other costs.

76. Should volatility be a concern, attention needs to be paid to large price movements, which are both difficult to predict and disruptive for economic decisions. Such volatility is bad for both producers and consumers. An example of such disruptive volatility is the global foodgrain price spikes at the end of the 2000s. During 2007-2013, world rice prices were much higher and more volatile²¹ than during 2000-2006, reaching high levels similar to those experienced in the 1970s, which induced the imposition of costly policies that were subsequently difficult to remove (World Bank 2012a). Concerns over similar distortive policy responses to price volatility in the recent period remain high.

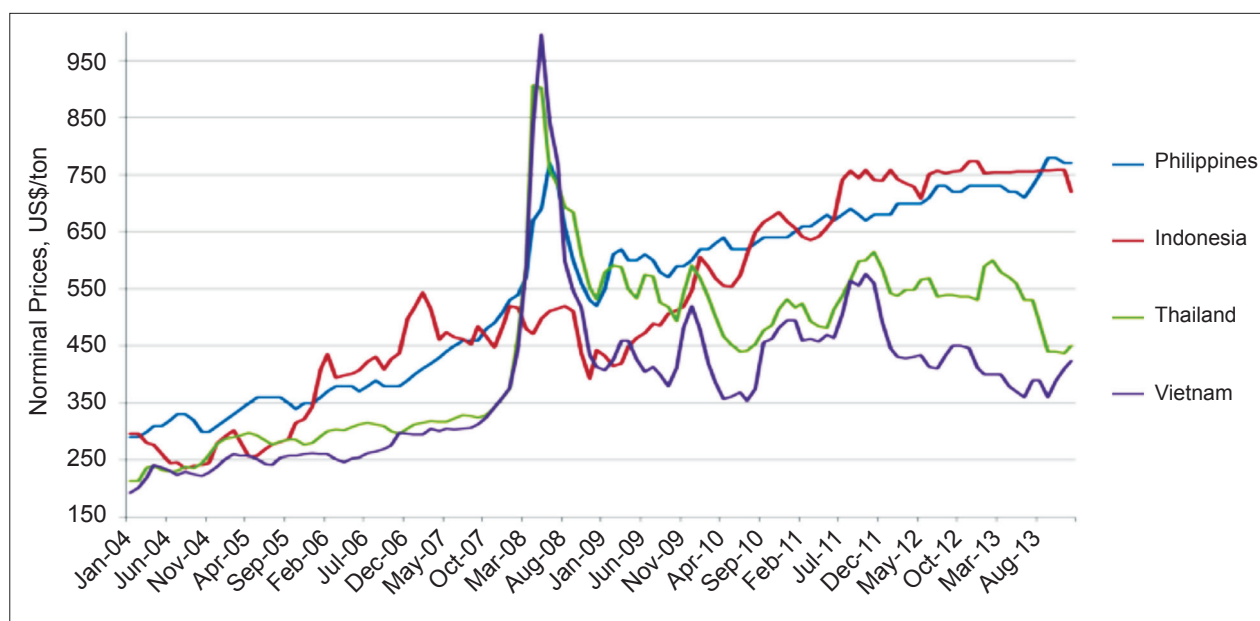
77. The strategic policy question is how to reduce price volatility. This is not a trivial question because many past efforts to stabilize rice prices in Asia have failed to help generate growth and reduce poverty. More stable prices *per se* do not guarantee the realization of economic gains. Success depends on how stability is achieved and the complementary measures taken. If domestic prices are stabilized for long periods of time without taking into account changes in world market prices, domestic prices often end up either at high levels in net importing countries (above import parity) or at very low levels in net exporting countries (below export parity). When this happens, stable prices may actually increase poverty, distort economic decisions, and eventually lower the quality of growth (World Bank 2012b). This interlinkage between price level and price volatility explains why more stable prices (food stability) at the expense of higher prices (food affordability) or lower prices (food availability) may actually reduce food security.

5.1 Government owned stocks

78. The Philippines and Indonesia, countries with less volatile rice prices than Myanmar, provide relevant examples. As net importers, the Philippines and Indonesia have used a mix of government-owned stocks and monopoly over import of rice for many decades to stabilize prices. They have succeeded in bringing volatility below the level observed on the world market (recall Figure 6). Yet these more stable prices are kept at a high level, well above the market prices in exporting countries (Figure 13). In most other countries where domestic food prices are stabilized through the use of large government-owned stocks and monopoly over trade, this is the most common outcome, creating many problems (World Bank 2012b).

²¹ During 2007-2013, the average volatility of the global grain price index was twice as high as during 2000-2006, see World Bank (2012a).

Figure 13: Nominal rice prices in selected countries, 2004-2013, \$/ton



Source: FAO-GIEWS (2014).

79. The first problem is that high prices hurt consumers, especially the poor. Unlike in developed countries, most consumers in developing countries spend a large share of their income on food (Table 17).²² Higher rice prices force them to spend even more. In addition, high rice prices tend to lower wage competitiveness. Eventually, the pace at which Indonesia and the Philippines are able to bring down domestic prices sustainably will have a bearing on their capacity to expand into any internationally competitive, labor-intensive activity.

Table 17: Food as a share of CPI in selected countries, %

Country	Share (%)
Myanmar	61.0
Bangladesh	58.8
Philippines	46.6
India	46.2
Vietnam	39.9
Indonesia	36.2
Thailand	33.0
United States	14.8
Euro zone	14.0
Japan	25.9

Source: ADB (2011), World Development Indicators, and World Bank (for Myanmar).

²² Note that the share of food in the CPI understates the importance of food to the poor, because the poor spend a much larger share of their income on food than do the middle class and the rich.

80. The second problem is that high rice prices do little to accelerate agricultural growth in these countries. High consumer rice prices trickle down to farmers in both Indonesia and the Philippines and higher paddy prices help induce *some* supply response (although some of the supply response comes at the expense of other crops). But this happens only in the short-term, because higher paddy prices lead to higher production costs as time goes on. In the Philippines, for example, labor costs account for 60 percent of paddy production costs and when rice prices go up, labor costs follow. Input suppliers adjust prices for seeds and fertilizers and land owners raise rental fees, aware of the short-term increases in rice farmers' purchasing power. Therefore, in spite of the 40 percent increase of farm-gate paddy prices in the Philippines from 2005 to 2010, the profit/cost ratio of paddy producers remained almost unchanged, at 35 percent (BAS 2013). During 2004-2012, paddy production grew by only 2.5 percent annually, not enough to meet the country's rising consumption requirements (Table 18). In Indonesia, paddy production grew by only 0.8 percent annually during the same time period. To induce a continuous supply response in such a situation, rice prices need to be adjusted upwards continuously, which is not possible from consumers' point of view.

81. The relationship between price volatility and agricultural growth is clearly complex. In Cambodia and Vietnam, for example, in spite of more volatile prices, paddy production grew much faster (Table 18). This does not imply that there is a positive relationship between volatility and growth. To the contrary, rice production could have been higher in Cambodia and Vietnam had their prices been more stable. What it does imply is that *how* stability is achieved really matters. Measures that contribute to more stable prices but undermine private sector development or crowd out public spending away from delivery of public goods, as is the case in both Indonesia and the Philippines (World Bank 2007; 2009) are not advisable. On the other hand, predictable trade policy as in Cambodia (Slayton and Muniroth 2012) and investments in rural development as in Vietnam can counteract some of the negative effects of price volatility and help encourage agricultural growth.

Table 18: Rice price volatility and paddy production in selected countries, 2004-2012

Country	Price volatility (%)	Annual growth of production (%)
China	3.5	2.8
Philippines	3.4	2.5
Indonesia	5.2	0.8
Thailand	6.4	1.5
Vietnam	8.3	3.2
Cambodia	8.0	5.2

Source: Price volatility data are from Figure 7. Paddy production data are from FAS-USDA (2014).

82. The third problem is high budget costs. Government-owned stocks are expensive. They are a recurrent expenditure for national budgets. In many instances public agencies tend to *buy high, sell low, and store long*, incurring large costs.²³ In 2008/09, India spent 1.5 percent of GDP on government-owned stocks of rice and wheat (Table 19), though it is likely to have recovered some of the costs by selling stocks. During 2008-2010, Indonesia spent 0.5 percent of GDP on its government-owned rice stocks. In 2004/05, the Philippines spent 0.4 percent of GDP, and scaled it up to 1 percent in 2009 (ADB 2011; World Bank 2012b). In comparison, in 2003 these countries spent only 0.06 percent of GDP on agricultural research

²³ The international experience shows that in contrast to private firms who seek to maximize their profit by buying low, selling high and storing short, and by this also helping to stabilize prices, public sector programs often have multiple objectives, including farm support and protection of consumers. As a result, public programs often pay above-market prices to farmers and sell stocks at below-market prices to consumers. In addition, it takes longer than for private firms to authorize purchases and releases of public stocks, increasing storage costs for the program.

and development (Pardey *et al.* 2006). In the Philippines, during 2009-2012, expenditures on irrigation and rural roads (key to reducing production and marketing costs) were only 0.17 and 0.05 percent of GDP, respectively. Due to the large spending on government-owned stocks, the Philippine National Food Authority is the most indebted state-owned corporation in the country. In 2012, the gap between its liability and assets was \$3.6 billion, or 1.4 percent of GDP (DBM 2013). The high fiscal costs of buffer stocks, therefore, have opportunity costs in terms of growth that offset the benefits of stable prices.

Table 19: Government spending on grain stocks in selected countries

Country	Spending on public stocks (% of GDP)	Spending on agriculture (% of GDP excluding [A])	Spending on agricultural R&D (% of GDP)
	[A]	[B]	[C]
India	1.0% (2004/05) - 1.5% (2008/09)	1.2% (2008/09)	0.06% (2008/09)
Indonesia	0.5% (2008-10)	0.8% (2008)	0.05% (2003)
Philippines	0.4% (2005-06) – 1.0% (2009)	0.8% (2005)	0.06% (2002)
Zambia	0.3% (2009) – 1.9% (2011)	0.6% (2010)	0.15% (2010)

Source: World Bank (2012b).

83. The fourth problem is the crowding out of private investments in trade and storage. In addition to a state monopoly over rice imports in both Indonesia and the Philippines, the low transparency and high uncertainty about imports, procurement, release, and rotation of stocks reduce private sector investment in many segments of the rice value chain. As a result, the private sector underperforms in terms of creating jobs and driving economic growth, which is needed for sustained poverty alleviation and shared prosperity. The extent of private sector underinvestment became obvious when the Philippines opened imports to the private sector in 2011. Despite concerns about the inability of the private sector to carry out import operations, private firms imported 660,000 of the 770,000 tons of total rice import; the Philippine National Food Authority imported only 110,000 tons compared to 2, 240,000 tons in 2010. Private import has not only brought budget savings but also reduced price volatility and stimulated creation of new jobs.

84. The fifth problem is the difficulty in choosing the right type of rice variety for stocking and price stabilization. Rice is not a uniform commodity. In Myanmar, 250 rice varieties with plant characteristics are recorded by the seed division of MOAI, and 1,074 varieties listed just by name, grain type, and location are regarded as local varieties (see Box 3). Substitution in consumption among different varieties is not perfect. Procuring one variety for the government stocks may not allow its effective consumption in other areas where different varieties are usually consumed.

85. In net exporting countries such as Myanmar, an additional problem originating from high prices is the loss of international competitiveness. In contrast to net importers, net exporters cannot elevate domestic prices above the world market level because they will not be able to export without extremely large subsidies. Large public stock programs are therefore not suitable for net exporters such as Myanmar (see also Box 4). The good news is that net exporters do not need large public stock programs as they are not vulnerable to the export bans of other countries. The two major Southeast Asian rice-exporting countries, Thailand and Vietnam, have both historically held low stocks. The current situation in Thailand is an exception as the government tried (and failed) to raise world market prices, as opposed to trying to stabilize domestic prices.²⁴ Thus, historical Thai experience from the 1950s to 1970s is more relevant to Myanmar today than is the current Thai rice policy.

24 See the World Bank (2014b) for the description and analysis of the rice pledging scheme in Thailand.

Box 4: Myanmar: Private Public Partnership in Rice Stock Management

In Myanmar, the government does not hold public stocks but works with the Myanmar Rice Federation to coordinate private stock releases by the private sector during rice price spikes. In summer 2013, for example, rice mills were reported to have collectively released stocks in the Mandalay region helping to put downward pressure on wholesale prices. Although this program does not have a large distortionary impact on the market, due to its low size, and rice mills sell at market prices, it may have a negative effect on rice mills' profits, who could have benefitted from higher prices. This partnership would need to be carefully managed to avoid pressures on rice mills to sell rice at the below-market prices and focus on information sharing and coordination. It is also important to realize that such a program will continue having a limited (e.g., short-lived and localized) impact on price volatility for most markets in the country until (i) storage costs are significantly reduced so that rice mills and traders can store more paddy and rice and release stocks when prices rise, and (ii) market transparency is improved so that the private sector rationally releases or buys stocks depending on the price outlook, thus bringing stability to the market through normal business transactions.

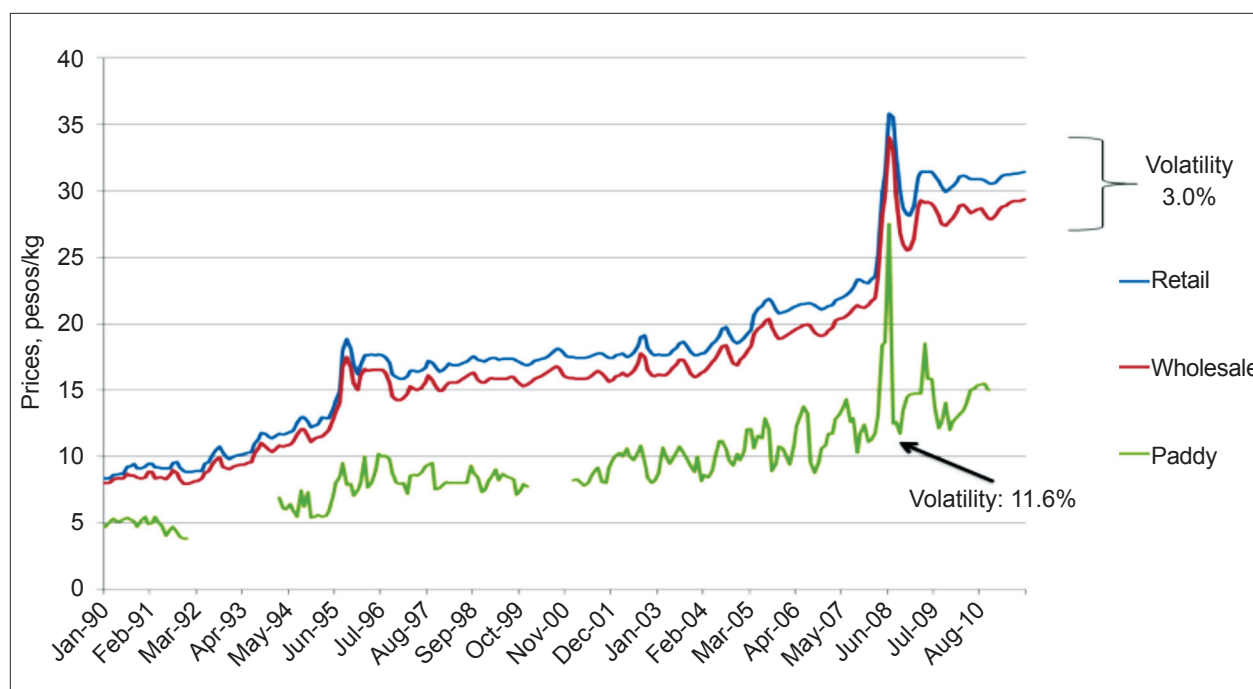
86. The international experience shows that in the short run, net exporting countries are left with very few options. They include: (i) trade restrictions and (ii) minimum farm prices, both to *directly reduce* price volatility, and (iii) social safety nets, to *mitigate the impacts* of volatility. Only the last one, safety nets, offers a long-term sustainable solution. The following analysis explains why.

5.2 Export trade restrictions

87. The benefits of export bans, taxes, or quotas rarely exceed their costs. Often they are not even effective at containing domestic price volatility. The export bans in Myanmar used frequently in the past did not help reduce domestic price volatility or reduce volatility of export prices much below the level prevailing in the world market (as discussed in Chapter 3). Myanmar aspires to increase rice exports to 2 million tons by 2014/15 and 4 million tons by 2019/20. The current export volume is around 1.3 million tons, and any use of the above trade policy instruments would make it impossible to achieve these export targets. Having been previously coerced to sell their stocks at a loss and facing frequent export bans, Myanmar millers and traders are suspicious of any restriction on trade. Even if trade measures are designed and communicated in a transparent manner (for example, a variable export tax), the private sector is likely to remain risk averse for many years to come, offering lower paddy prices to farmers in case of the use of export restrictions.

88. Another problem with the use of trade policy to stabilize prices is that it diverts attention from the key causes of volatility. As discussed in Chapter 4, rice price volatility is a result of many structural factors. Trade policy does not address any of them. Most difficult but important is tackling volatility at the farm level. In the Philippines, for example, in spite of the successful stabilization of consumer rice prices, paddy prices remain volatile (Figure 14) due to ineffective management of irrigation systems, and underinvestment in rural infrastructure, research and extension services, and other productivity-inducing activities (World Bank 2007). Paddy prices in Myanmar are volatile for similar reasons, compounded by the heavy concentration of production in just two months of the year. As a result, the growth of agricultural production remains low, despite the large amount of funds spent on stabilization of consumer prices. Unless public investments address the key causes of volatility at the farm-gate, stabilizing consumer prices alone will continue to undermine growth and poverty reduction as discussed above.

Figure 14: Philippines: Volatility of farm-gate, wholesale and retail prices, 1990-2011



Source: Authors' estimates based on data from the Philippine Bureau of Agricultural Statistics.

5.3 Minimum farm prices

89. Some countries intervene at the farm-gate level through minimum prices for stabilization. While price support is popular with farmers, it creates many problems. This is especially true for exporting countries if the support and release prices are set too high, which can easily occur when politicians get in a bidding war for farmers' votes in contests where farmers represent a large share of the electorate. If set too high, they cannot be easily reduced; then exports are reduced and the government needs to subsidize exports, which is costly and thus impossible for most developing countries. To have the intended price impact, the quantities purchased must be stored a considerable time, incurring storage and interest costs, and even then sale prices may still decline, as has happened in Thailand. If held too long, quality problems arise. Finally, intervention efforts can often breed corruption. The recent Thai experience with the rice pledging scheme is particularly instructive (Nipon 2014).

90. The Thai government spent large quantities of money in attempts to raise prices for farmers, but the end result was that many farmers were not paid at all for their paddy. The program failed to raise world market prices as other countries were able to increase their exports at the expense of Thailand, pushing world market prices down. As a result, Thailand's rice ending stocks increased from 6.1 million tons (or 60 percent of domestic use) in 2009/10 to 14.4 million tons (or 134 percent of domestic use) in 2013/14 (FAS-USDA 2014). The subsidy cost the government \$12.7 billion or 3.5 percent of GDP in its first year of operation, raising the country's fiscal deficit to 4.4 percent of GDP in 2012 from 1.7 percent in 2011. The scheme cost the government another \$13.9 billion or 3.6 percent of GDP in 2013 (World Bank 2014d). The 2013/14 export is projected to increase to 8.5 million tons from 7.0 million tons in 2012/13, helped by the significant decline in Thai prices, but it falls short of the 11.0 million tons exported in 2010/11 (FAS-USDA 2014).

91. There are many other indirect but similarly significant costs:

- Thailand's reputation of exporting high-quality rice for which a premium is paid is being undermined by farmers switching to varieties with the shortest growing seasons and highest yields. These are varieties with inferior palatability.
- The long-term storage of milled rice is resulting in a deterioration of its quality and leading to reports of the presence of excess chemicals.
- The already overbuilt rice milling industry is expanding, which will lead to the closure of mills not enrolled in the program.
- Farmers' costs of production are rising, reflecting a doubling of land rents and increased use of and a 20 percent increase in the prices of fertilizer and pesticides.²⁵ The higher land rents are a direct consequence of the pledging policy.
- Unable to supply their customer base of over 10 million tons with Thai rice, Thai exporters have started to trade third country rice on a large scale and invest in rice mills in competitor countries, in particular Cambodia. Both actions directly enhance the long-term competitiveness of other countries.

92. During 2004-2008, the volatility of farm-gate paddy prices was 31 percent lower than the volatility of wholesale rice prices (Table 20). Despite the above costs, the volatility of wholesale rice prices in Thailand remained high. During 2009-2013, the difference was 13 percent. It is important to understand the reasons for more stable paddy prices in Thailand and the failure of other countries such as the Philippines to achieve the same result (recall Figure 14 and see Table 20).

Table 20: Volatility of paddy and rice prices in the Philippines and Thailand, %

	Thailand		Philippines	
	Farm-gate paddy	Wholesale rice	Farm-gate paddy	Wholesale rice
2004-2008	5.9	7.7	6.4	4.3
2009-2013	4.4	5.0	4.1	1.7

Note: For Thailand, paddy prices are non-glutinous average national farm-gate prices and wholesale prices are 25% broken in Bangkok. For the Philippines, paddy prices are average national farm-gate prices and wholesale prices are national average prices for regularly milled rice.

Source: FAO-GIEWS (2014).

93. When a government commits to buy a large portion of production, farm-gate price stability is an achievable outcome. This has happened in Thailand. But in the Philippines the government's paddy procurement was only 2 percent of total production during 2006-2012. Due to the lack of budget resources, an emphasis has been made on announcing a minimum farm price and requesting traders and millers to buy at the fixed price. Enforcing minimum prices in this situation is difficult, however: the actual paddy prices in the Philippines have usually been below the minimum support prices, and the volatility of paddy prices has remained high. Traders and millers pay prices to farmers based on the cost of doing business, competition, and marketing expenses (Box 5 describes a similar situation for livestock prices in Lao PDR).

94. How would Myanmar enforce minimum farm prices if they were introduced? The Farmers' Rights Protection Act adopted in 2013 foresaw the introduction of minimum farm prices. While the design and implementation details are not yet clear, it seems that given the lack of sufficient budget resources to buy and store a large share of paddy, the Thai approach is unlikely to be used in Myanmar. If minimum farm prices are introduced, Myanmar would follow the Philippine's approach, requesting paddy buyers to honor officially announced farm prices. If the lessons from the Philippines are instructive, the volatility of paddy prices in Myanmar will not be reduced unless the core factors of volatility (discussed in Chapter 4) are addressed.

²⁵ "Broken Rice," *Wall Street Journal*, July 26, 2013.

Box 5: Lao PDR: Minimum Prices for Swine Products

Rice is not the only commodity in Southeast Asia for which governments have tried to set minimum farm prices. In Lao PDR, for example, the government set the prices for pigs at 18,000-20,500 kip per kg at the farm level; at 22,500-25,000 kip per kg at the slaughterhouse; and at 37,000 kip per kg at the markets. The government does not actually buy these products but sets a reference minimum price for traders. But the price compliance has proved difficult to control.²⁶ 1 Actual farm pig prices are often below the announced minimum prices for the same reason as seen with paddy prices. The private sector faces high transaction costs working in rural areas and cannot afford to pay the announced prices. Farmers prefer to obtain cash for their products rather than waiting for elusive traders to pay a high minimum price.

95. It is important that Myanmar does not introduce minimum farm prices but instead focuses on export promotion and public investments to address the underlying causes of price volatility (e.g., poor roads, production concentrated in time, old irrigation systems). Minimum farm prices are not suitable to stabilize rice prices in a low-income developing country aspiring to become a net rice exporter and to translate rice sector growth into poverty reduction. This policy instrument would need to be abandoned.

5.4 Safety nets

96. Although the price volatility can be reduced to some extent, rice prices in Myanmar will remain volatile. Even this reduced volatility will have a negative impact on the poor. International experience suggests that this negative impact can be mitigated by safety net programs (Grosh *et al.* 2008). In turn, when effective safety nets are in place, there is more popular support for open trade policy, which is vital to the successful development of the rice sector.

97. Formal safety nets in Myanmar are still absent, thus work needs to start now to establish them. There are emerging lessons from Myanmar, as several development partners have introduced safety nets (including cash and food for work, and cash transfers), predominantly to provide emergency relief to food-insecure households and other vulnerable groups in the aftermath of Cyclone Nargis and other natural disasters (see Infante-Villaroel, forthcoming). Recently, the Ministry of Education and Training introduced Myanmar's first conditional cash transfer program – a stipend program targeted to poor students, mainly orphans to prevent early dropouts (often caused by income insecurity). There are many other lessons from around the world, as summarized below.

98. In many Asian countries, rice remains closely tied to food security objectives, particularly as an important element of a food-based social safety net program. Food-based safety nets are designed to ensure livelihoods (for example, through provision of employment in a public works program with wages paid in food), increase purchasing power (through the provision of food stamps, coupons, or vouchers), and relieve deprivation (through the direct provision of food to households or individuals). They differ from cash-based programs – public employment (with wages paid in cash) or cash transfers – in that they are tied to food as a resource.

99. Both food and cash-based safety nets range from universal subsidies to more targeted programs. The choice of instrument depends on country circumstances, such as administrative capacity to identify and deliver benefits to the targeted population. Cash-based assistance may be conditional or unconditional, depending on whether beneficiaries are required to comply with co-responsibilities, typically related to accessing health, education, and nutrition services or to being part of public work programs. Often governments choose to use food-based (in-kind) transfers because they are concerned about high food prices or because commodities markets are inadequate and therefore they have to guarantee access to food by the poorest people. But often the selection of food-based transfers is also a result of the existence of

²⁶ "Pig Farmers Still Struggling Despite Price Rising", Vientiane Times, May 5, 2014.

large government-owned grain stocks established to support farmers that need to be released and rotated. For example, India, Indonesia, and the Philippines, with their government-owned stocks to help maintain high producer prices, often release stocks at subsidized prices to consumers. Myanmar has also been considering the establishment of government-owned stocks, but so far its stock program has been limited to support for private stockholding by rice millers under the coordination of the Myanmar Rice Federation (Box 4). Implementation of such programs poses several logistical and implementation challenges related to procurement and storage of food, transportation and distribution, and waste, spoilage, and pilferage (as described in Chapter 5). International experience with food-based safety nets has very often been discouraging (Grosh *et al.* 2008).

100. More and more Asian countries are now moving from poorly targeted and largely ineffective in-kind food transfers to more targeted cash transfer programs, inspired by the success of other countries. This is because in most cases targeted cash-based assistance does not distort production and consumption choices and it has relatively low administrative costs, leakage, and pilferage compared to in-kind transfers. The Philippines, for example, has started to move towards cash transfers gradually replacing its subsidized rice distribution program. The global food price crisis of 2008 increased the Philippine government's attention on the need to develop improved and more cost-effective social protection measures as an alternative to the badly targeted rice distribution program. In particular, the crisis reinforced the need to improve the targeting of social safety net spending and accelerate the roll-out of a cash transfer system. In 2008, the government launched a conditional cash transfer program that focuses on supplementing the income of the poorest households while also supporting their human capital development (Fernandes and Olfindo 2011). At the same time, the government improved the targeting of poor households by developing a Proxy Means Test methodology for identifying the poor. The early results of this conditional cash transfer program's success in reaching the poor in a cost-efficient manner and in changing recipients' behavior are very encouraging. The program is also credited with reducing poverty incidence among beneficiaries by about six percentage points (Velande and Fernandes 2011).

101. Cash transfers are considered to be the fastest and least costly method of reaching poor and vulnerable households if the delivery infrastructure exists and markets are functioning. Using cross-sectional household surveys from Indonesia carried out before and after the 1998/99 economic crisis, Skoufias *et al.* (2011) found that cash transfer programs can play an important role in helping households protect their consumption of essential nutrients during a crisis. However, to ensure that all micro-nutrients are consumed, relying entirely on cash transfers may not be sufficient. Targeted micro-nutrient supplementation programs may have to accompany cash transfer programs to ensure that key micro-nutrients are not sacrificed during crises.

102. In low-income countries, public works are often more common for social protection than direct cash transfers. Public work programs are more politically acceptable as they produce community assets, they can be quickly rolled in and out, responding to price shocks in a fiscally responsible manner, and they can contribute to peace building and social cohesion. In Ethiopia, for example, the successful Productive Safety Net Program emerged after two decades of *ad hoc* emergency food aid. This program uses community identification to reach poor and chronically food insecure households in need either through employment opportunities to able-workers or unconditional cash transfers to those unable to work (World Bank 2012b). In most social protection programs in Myanmar, which are mainly implemented by donors, public works (increasingly cash for work) also dominate, helping address seasonal unemployment and food insecurity (Infante-Villaroel, forthcoming) as reflected in the high seasonality of rice prices in Myanmar as discussed in Chapter 4.2.

103. It will be important for Myanmar to learn from these experiences when building its social protection system. The country does not need large government-owned rice stocks to later provide food transfers to the poor and vulnerable at times of food price spikes. Cash-based assistance, either through direct transfers to the most vulnerable or through public work programs, is more effective at achieving most social and economic objectives, and much better than food distribution from government-owned stocks.²⁷

²⁷ However, supplementary food-based transfers may remain relevant in isolated and thin food markets in rural areas, where cash transfers can cause additional increases in the price of food, or in emergency situations to replace nonfunctioning markets.

6. Conclusions and Recommendations

Conclusions

104. Rice prices in Myanmar have been volatile. While some price volatility is common for agricultural markets and price volatility tends to be higher in rice-exporting countries (of which Myanmar is one) than in rice-importing countries, during 2004-2013 the volatility of domestic prices in Myanmar was above the level of its peers. This high volatility is of concern to the Myanmar government given the high importance of rice in farm incomes and consumer expenditures.

105. Pawsan prices have displayed the highest volatility. Pawsan is not widely produced and traded in Myanmar yet; as a result it is mostly exposed to local shocks. The prices of MWK have been much less volatile.

106. Export restrictions were used frequently in the past to reduce price volatility. To some extent, export restrictions might have helped reduce price volatility. The price volatility of exported Emata rice was lower than the volatility of Vietnamese and Thai rice export prices. It averaged 5.8 percent during 2004-2013. The average price volatility was 6.2 percent in Thailand and 7.8 percent in Vietnam.

107. Yet the price volatility of exported Emata was lower during 2009-2013 than during 2004-2008. At the same time, both international and local trade has been more open in recent years than in the earlier period, implying that other factors played a larger role in defining volatility than export restrictions.

108. The lower volatility of export prices appears to have had little impact on the volatility of domestic prices. During 2004-2013, the average price volatility of MWK variety in Mandalay, Myingyan, Patheingyi, and Yangon markets was 60 percent higher than the price volatility of Emata, which is exported. The price volatility of high-quality, fragrant Pawsan was 90 percent higher.

109. In addition, the volatility of paddy prices was higher than the volatility of rice prices. During 2009-2012, the time period with available price data, the volatility of paddy prices was 40-110 percent higher depending on the market and rice variety.

110. While price volatility has moderated in recent years, the evolving concern is the rising price level. Emata prices increased by 41 percent in nominal US\$ terms between 2009 and 2013, much more than in peer rice net-exporting countries. The increase of rice prices in Myanmar was a result of the large public wage increase in 2009, the increased cross-border trade in rice with China, and economic transition in general. By the end of 2013, Myanmar rice prices had equalized with prices in Vietnam and Thailand. These higher prices not only put competitive pressure on exporters but also put a high premium on careful management of price volatility to avoid further price increases.

111. Why is the rice price volatility in local markets in Myanmar higher than the price volatility in other countries? Myanmar's status as a net rice exporter does not explain much of this high domestic price volatility. The country is still weakly integrated with the world rice market; i.e., the world price's volatility is not yet fully passed onto Myanmar. During 2004-2013, Vietnamese prices adjusted to the changes in Yangon prices but Emata prices in Yangon remained unresponsive to price changes in Vietnam, one of the major competitors of Myanmar's rice exports. Moreover, the high market segmentation in Myanmar has weakened the link between its Emata prices and prices of domestic rice varieties.

112. Most drivers of domestic rice price volatility in Myanmar seem to be internal. Most price volatility is seasonal. The high concentration of paddy production in November and December results in sharp drops of paddy prices in December and January and sharp rises between May and October, depending on the market. Paddy prices have been more volatile than rice prices. This seasonal volatility is amplified by other

forces. Weak domestic market integration has prevented price signals from being transmitted quickly from surplus to deficit areas. Weak domestic integration is a result of the fragmented rice market, poor roads and low phone connectivity, the improvement of which will take time. But it is also a result of weak market transparency, which can be improved in the short run. Data on production, consumption, exports, and stocks, even if available, are not accurate. As a result, market participants and the government often overreact to small changes in prices; given the small size of private rice stocks, this ignites volatility. Weak geographic diversification of exports also contributes to price volatility in Myanmar. Most formal exports go to Africa, while China absorbs most of the cross-border exports. The latter are informal and reported to be highly unpredictable.

Recommendations

113. Successfully reducing price volatility in Myanmar to achieve higher food security and lower poverty relies on addressing the structural causes of volatility. Better access to irrigation, seeds with different harvesting periods and growth duration, and advice on production technologies would allow farmers to spread production more evenly over the marketing year and would reduce the volatility of paddy prices. Investments in rural roads and telecom infrastructure would strengthen market integration: signals would pass more quickly from one market to another, including from world markets with lower price volatility than in Myanmar. More accurate and timely distributed market information would help the private sector and the government to make more rational decisions. Lower costs of doing business for rice mills and traders would reduce storage costs and increase private stocks which would buffer price fluctuations. Diversification of exports to additional markets – both geographically and by quality – supported by investments in sanitary and phytosanitary infrastructure, ports, and less costly export procedures, would further contribute to lower price volatility (see the summary of the policy recommendations in Table 21).

114. International experience suggests that safety nets can help mitigate the impact of volatile prices on the poor. Even if domestic price volatility is reduced through the policy actions and investments discussed above, many poor consumers will remain vulnerable to price spikes in the short run. International experience shows that effective safety nets can mitigate food price spikes, allowing vulnerable households to maintain their assets on which their livelihoods are based and adequately nourish and educate their children. Cash transfers, either direct or provided through public work programs, are often more successful than food subsidies at meeting the objectives of effective social safety nets. Myanmar can take advantage of the international experience to replicate best practices and avoid failures made by others.

115. A number of policy actions can be implemented quickly; they do not cost much (if anything) to the national budget, and would have a broad impact on the rice value chain's participants. These priority actions can lead the way to the needed longer-term investments and policies, and without them it will be very difficult to significantly reduce price volatility. They include the following

- Continue to promote an open trade policy. Stronger integration of Myanmar with world markets will not only lead to higher export volumes but will also lower domestic price volatility by encouraging investments in rice mills, private storage infrastructure, and export logistics. The lower volatility of the exported Emata prices is a powerful reminder to the power of open trade to reduce price volatility.
- Make the rice milling industry more attractive for foreign direct investment by removing the industry from the list of strategic sectors requiring special government approval and permitting all types of investments, not just “green” ones. Myanmar needs cost-efficient and competitive mills to turn paddy into valuable rice for both domestic and foreign markets and improve rice quality, and thereby reducing price volatility. A modernization of the rice industry can trigger lasting changes at the farm level (higher productivity, better paddy quality, and more evenly spread production) and allow the industry absorbing a potentially larger paddy production, as has happened in Cambodia, Thailand, and Vietnam. Modernized rice mills will be also better positioned to increase the level of private stocks which would further reduce price volatility.

- Avoid exacerbating the current situation by not using distortive policy instruments. As an exporter, Myanmar is poised to have price volatility higher than seen in countries which import rice. Any direct short-term price stabilization measures need to be treated with caution so as not to undermine food security. Measures that raise domestic prices above world market prices such as large public stocks or farm minimum prices cannot be used by a country that aspires to become a large exporter and where domestic prices have already been dangerously approaching the world market levels. Measures that depress domestic prices below the world market level, such as export restrictions, would deprive farmers and hamper investments in rice mills and trade sectors.

Table 21: Myanmar: Summary of policy recommendations

Constraints	Recommendations	Implementing agencies
Immediate priorities		
Unpredictable trade policy ignites volatility and hampers investments in rice mills, storage, and trade infrastructure	<ul style="list-style-type: none"> • Commit to open trade policy, honor export license commitments, avoid export bans, and collect more accurate market data and provide it to the public 	Ministry of Commerce, in collaboration with Myanmar Rice Federation
Treatment of rice mills as a strategic sector and restricting investments in existing mills discourages foreign direct investment	<ul style="list-style-type: none"> • Ease the rules for foreign direct investment in rice mills 	Ministry of Commerce, in collaboration with Myanmar Rice Federation
Currently discussed agricultural policy instruments are harmful for food security and poverty reduction	<ul style="list-style-type: none"> • Avoid using export restrictions, do not build government-owned rice stocks, and do not introduce minimum farm prices 	Ministry of Commerce and Ministry of Agriculture and Irrigation, in collaboration with Myanmar Rice Federation
Longer-term priorities		
The high concentration of paddy production in the last quarter of the year increases volatility of paddy and rice prices	<ul style="list-style-type: none"> • Invest in irrigation and water management, improve access to seeds with different harvesting periods, and strengthen public farm advisory services 	Ministry of Agriculture and Irrigation
Weak domestic market integration prevents price signals from being transmitted quickly, leading to excessive price drops in surplus areas and price spikes in deficit areas	<ul style="list-style-type: none"> • Invest in rural roads, develop transport services in rural areas, and invest in telecommunication infrastructure 	Ministry of Livestock and Fisheries (Rural Development Department) Ministry of Communication and Information Technology
Weak geographic diversification of exports increases price volatility	<ul style="list-style-type: none"> • Reduce energy costs to mills, reduce export processing costs and invest in ports, invest in sanitary and phytosanitary infrastructure, and develop rice standards aligned with international practices 	Ministry of Commerce and the Port Authority, in collaboration with Myanmar Rice Federation Ministry of Energy (for investments in energy infrastructure)
The lack of safety nets does not allow effective protection of the poor from food price spikes	<ul style="list-style-type: none"> • Study international and domestic experiences to establish cost-effective safety nets able to mitigate the impact of food price spikes 	Ministry of Social Welfare, Relief and Emergency Ministry of Livestock and Fisheries (Rural Development Department)

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8. Annexes

Annex 1: Rice Prices in Myanmar

Nominal prices of Pawsan, Kyats per ton

Year	Month	Yangon	Pathein	Mandalay	Myingyan
2004	January	168,878	131,665	170,715	125,194
	February	163,591	104,883	176,472	122,479
	March	192,067	112,272	183,392	139,401
	April	200,274	141,116	177,676	136,000
	May	199,477	161,264	192,904	134,727
	June	199,028	150,547	190,516	134,482
	July	199,763	150,302	191,088	134,625
	August	199,273	156,794	185,964	145,872
	September	201,315	157,385	212,766	162,591
	October	201,029	152,588	212,154	155,650
	November	184,535	126,317	212,236	117,641
	December	169,511	118,396	151,364	114,212
2005	January	163,489	132,686	155,650	117,764
	February	163,509	127,582	170,307	194,884
	March	164,877	139,218	180,167	199,865
	April	169,123	151,057	192,108	197,354
	May	171,634	154,630	204,336	210,929
	June	175,472	164,938	205,765	226,239
	July	181,187	170,450	214,277	233,057
	August	185,678	173,512	217,931	232,975
	September	188,046	177,860	217,870	238,160
	October	223,687	195,721	238,814	244,958
	November	250,286	198,824	259,288	225,014
	December	175,553	173,512	246,856	212,501
2006	January	198,049	168,409	212,297	221,483
	February	209,623	191,373	224,422	243,713
	March	243,182	216,890	261,962	301,604
	April	280,579	257,716	306,687	367,437
	May	300,318	274,557	335,837	360,558
	June	315,036	290,888	332,102	353,148
	July	310,995	347,024	377,194	449,090
	August	348,841	369,989	442,945	451,131
	September	372,622	405,712	468,931	444,599
	October	406,018	416,776	487,773	422,042
	November	376,174	408,467	506,532	423,430
	December	336,144	374,173	350,045	423,859

2007	January	424,165	360,292	419,143	469,156
	February	434,270	384,033	460,154	483,547
	March	457,867	357,230	457,622	472,912
	April	466,400	363,620	467,911	511,615
	May	466,563	398,057	485,752	524,496
	June	491,488	422,308	498,898	523,598
	July	514,024	440,924	521,903	539,234
	August	517,678	445,272	544,358	566,853
	September	521,291	455,009	548,073	591,124
	October	521,250	393,974	553,299	591,124
	November	457,255	295,991	448,559	531,559
	December	433,576	286,805	383,563	530,865
2008	January	457,602	316,669	428,676	281,048
	February	472,259	322,793	409,345	454,805
	March	468,196	326,202	407,120	469,115
	April	485,262	340,226	412,693	479,934
	May	793,664	418,470	528,844	569,405
	June	747,959	476,300	590,287	586,491
	July	734,098	382,747	586,756	595,044
	August	727,015	520,536	618,356	597,085
	September	733,465	534,825	696,273	597,289
	October	728,750	530,742	754,103	597,085
	November	714,767	461,848	698,110	524,006
	December	652,466	408,896	432,085	449,090
2009	January	652,466	292,174	401,057	458,071
	February	593,574	306,197	406,283	464,971
	March	595,819	315,383	408,896	454,764
	April	615,294	336,817	452,641	485,833
	May	563,056	353,413	515,432	504,838
	June	502,674	350,086	533,886	505,226
	July	473,055	385,298	553,666	505,226
	August	485,425	366,416	552,156	518,637
	September	457,724	357,230	557,361	536,621
	October	498,489	394,239	539,949	553,605
	November	453,580	389,891	519,352	556,259
	December	357,230	341,920	489,916	393,729
2010	January	359,108	341,920	425,574	421,613
	February	439,802	340,655	463,828	432,922
	March	471,544	417,449	513,085	488,222
	April	480,220	398,057	522,005	504,695
	May	492,059	414,387	516,004	519,168
	June	485,609	408,263	545,787	556,259
	July	487,262	428,676	542,582	542,276

	August	521,556	438,883	585,388	535,846
	September	515,432	451,641	611,864	535,846
	October	534,478	438,883	634,380	615,926
	November	618,519	443,313	697,579	625,255
	December	532,947	436,495	663,305	556,259
2011	January	483,792	392,953	551,911	547,420
	February	501,919	461,848	581,632	581,571
	March	502,164	474,606	643,770	617,498
	April	573,773	459,296	633,665	633,951
	May	571,956	481,751	634,196	658,324
	June	564,220	531,518	614,661	658,488
	July	577,141	603,883	632,277	658,324
	August	609,537	609,843	640,545	658,324
	September	615,314	601,331	663,162	688,944
	October	650,302	581,775	663,550	704,254
	November	666,061	582,632	677,166	704,254
	December	571,569	551,666	661,672	642,586
2012	January	483,547	365,498	530,048	556,259
	February	488,793	466,604	539,030	569,527
	March	520,413	517,474	574,488	603,209
	April	537,377	519,311	599,922	607,292
	May	536,050	517,474	591,308	608,312
	June	534,315	512,023	578,366	607,292
	July	536,866	520,536	568,160	622,601
	August	541,765	530,069	596,064	649,139
	September	555,238	577,692	632,808	683,841
	October	547,073	528,599	613,763	683,841
	November	520,536	472,912	566,465	683,841
	December	480,995	376,357	580,938	683,841
2013	January	418,470	414,734	514,595	683,841
	February	435,474	430,759	509,186	500,122
	March	431,228	434,943	530,742	500,122
	April	456,234	438,883	527,333	357,230
	May	485,017	464,604	564,771	392,953
	June	502,674	474,953	589,430	548,604
	July	506,246	495,019	606,822	571,569
	August	551,155	525,027	663,428	571,569
	September	540,949	535,846	636,217	571,569
	October	530,742	536,866	611,721	571,569
	November	530,742	512,881	611,721	571,569
	December	477,158	581,775	557,953	571,569

Source: MIS/MOAI (2014).

Nominal prices of Manawthukha, Kyats per ton

Year	Month	Yangon	Pathein	Mandalay	Myingyan
2004	January	89,777	79,101	111,190	61,934
	February	82,571	72,732	112,252	62,076
	March	79,142	85,225	113,722	64,771
	April	82,020	100,024	121,377	69,670
	May	82,755	103,086	125,357	71,487
	June	85,613	104,107	145,240	71,977
	July	92,512	107,169	160,937	71,548
	August	97,269	108,455	158,631	72,936
	September	103,086	124,929	157,773	79,019
	October	101,739	119,927	149,036	78,938
	November	94,105	85,490	145,240	62,832
	December	89,001	104,311	109,353	64,342
2005	January	92,267	99,514	113,946	70,670
	February	108,700	103,862	128,317	112,660
	March	113,579	115,743	138,095	125,071
	April	116,763	128,950	150,200	140,994
	May	124,684	133,461	156,691	148,077
	June	126,807	142,280	169,429	159,039
	July	131,665	148,771	182,453	166,000
	August	142,116	144,321	186,066	156,508
	September	144,505	149,016	190,863	155,365
	October	161,529	148,669	200,886	170,287
	November	172,573	151,874	193,578	158,427
	December	134,604	133,461	183,269	136,727
2006	January	138,115	139,320	176,247	153,446
	February	144,260	148,261	199,335	170,634
	March	168,266	171,226	204,703	193,129
	April	182,555	192,394	237,017	229,199
	May	189,475	204,132	271,801	240,426
	June	198,865	218,176	260,676	235,915
	July	211,440	244,958	287,029	242,345
	August	223,340	214,338	291,275	256,859
	September	225,361	245,223	279,109	258,921
	October	224,994	262,309	297,624	299,277
	November	213,154	223,524	314,301	317,853
	December	215,502	239,099	254,552	262,432
2007	January	269,372	261,901	304,299	285,846
	February	277,272	298,298	342,492	327,264
	March	287,009	290,132	344,268	328,346
	April	308,443	301,094	354,025	329,183

	May	307,524	319,670	356,230	340,594
	June	329,326	339,369	364,844	345,187
	July	344,676	344,574	382,563	335,756
	August	350,249	348,044	394,913	322,528
	September	354,944	339,369	408,263	319,731
	October	352,433	321,099	390,443	327,978
	November	334,204	265,371	297,297	275,741
	December	326,611	267,004	264,228	269,903
2008	January	333,041	257,206	280,885	291,480
	February	336,817	265,636	302,196	297,583
	March	335,102	273,945	331,530	306,585
	April	328,427	273,945	336,470	318,772
	May	587,736	327,897	375,745	371,356
	June	408,263	332,735	377,378	369,784
	July	387,462	315,894	378,174	304,238
	August	367,437	275,067	387,279	288,295
	September	360,537	275,986	384,849	282,416
	October	363,354	264,105	395,832	277,884
	November	340,818	260,268	259,166	245,897
	December	309,300	207,194	213,950	213,113
2009	January	309,300	197,252	228,627	224,545
	February	286,295	194,190	236,160	244,958
	March	280,579	219,033	260,207	250,245
	April	278,578	233,731	277,905	282,661
	May	261,962	251,347	297,563	306,973
	June	258,227	260,268	302,013	301,094
	July	288,540	263,085	315,138	301,094
	August	269,454	263,330	333,163	287,479
	September	267,719	270,474	339,389	284,355
	October	284,764	299,829	325,120	298,420
	November	273,863	283,335	320,323	324,855
	December	269,229	274,822	329,489	321,936
2010	January	275,231	279,415	348,065	350,555
	February	275,945	310,035	350,433	359,353
	March	273,536	324,569	361,293	393,790
	April	286,805	311,301	386,401	392,953
	May	299,216	311,301	395,280	389,810
	June	293,174	326,611	381,971	402,384
	July	293,643	338,103	387,605	393,709
	August	312,117	353,148	416,714	392,953
	September	309,872	334,266	428,146	392,953
	October	310,443	331,714	426,717	413,367
	November	294,970	312,934	440,108	418,266

	December	276,598	279,926	424,390	341,920
2011	January	267,004	278,027	353,964	333,082
	February	280,436	304,932	361,333	369,274
	March	292,276	305,177	396,546	414,530
	April	294,480	289,520	392,096	406,283
	May	287,744	280,681	382,298	392,953
	June	284,641	278,640	370,703	390,912
	July	279,191	274,557	360,884	382,747
	August	279,987	272,618	356,230	382,747
	September	284,049	270,474	357,312	394,321
	October	289,336	271,760	361,272	403,160
	November	280,334	251,347	368,886	387,074
	December	269,597	238,324	353,964	318,098
2012	January	262,105	226,178	278,170	270,474
	February	263,983	231,955	295,195	285,437
	March	276,374	231,342	342,635	307,218
	April	277,109	242,917	341,349	311,301
	May	271,903	234,751	314,710	305,993
	June	273,536	239,855	330,693	290,888
	July	287,315	257,553	327,468	311,301
	August	302,115	264,493	342,267	328,652
	September	319,466	265,902	358,088	357,230
	October	320,078	279,068	359,272	357,230
	November	312,832	281,498	369,131	353,413
	December	301,094	281,702	375,949	357,230
2013	January	281,967	265,371	332,571	357,230
	February	306,197	292,582	359,496	362,334
	March	328,142	295,991	386,156	362,334
	April	323,549	299,400	398,057	500,122
	May	328,244	306,197	412,489	540,949
	June	316,404	338,103	431,228	399,343
	July	340,900	347,024	458,337	420,511
	August	387,850	358,006	484,813	418,470
	September	347,024	336,817	510,329	418,470
	October	371,928	355,597	515,085	418,470
	November	371,928	355,597	515,085	418,470
	December	275,578	285,784	432,759	418,470

Source: MIS/MOAI (2014).

Nominal prices of Emata, Kyats per ton

Year	Month	Yangon
2004	January	82,673
	February	78,162
	March	78,938
	April	78,060
	May	74,508
	June	79,326
	July	84,633
	August	87,144
	September	97,269
	October	86,368
	November	84,613
	December	84,715
2005	January	86,450
	February	90,349
	March	99,596
	April	106,883
	May	127,154
	June	113,028
	July	118,090
	August	123,785
	September	122,091
	October	125,357
	November	125,541
	December	125,541
2006	January	129,624
	February	132,624
	March	138,238
	April	166,367
	May	182,514
	June	180,126
	July	203,989
	August	192,272
	September	189,883
	October	205,030
	November	227,382
	December	213,522
2007	January	220,319
	February	227,607
	March	228,627
	April	229,648

	May	229,648
	June	229,648
	July	230,383
	August	239,855
	September	239,855
	October	238,242
	November	228,321
	December	243,529
2008	January	266,678
	February	268,433
	March	268,433
	April	268,433
	May	319,588
	June	307,892
	July	301,094
	August	301,094
	September	301,094
	October	298,032
	November	298,032
	December	298,032
2009	January	298,032
	February	298,032
	March	274,353
	April	274,353
	May	224,953
	June	224,545
	July	204,132
	August	204,132
	September	224,545
	October	242,917
	November	224,545
	December	234,343
2010	January	240,875
	February	255,165
	March	255,165
	April	255,165
	May	257,859
	June	276,231
	July	279,660
	August	279,660
	September	279,660
	October	279,660
	November	277,619

	December	269,454
2011	January	268,229
	February	279,660
	March	279,252
	April	274,353
	May	259,247
	June	251,898
	July	244,958
	August	249,041
	September	268,637
	October	269,454
	November	265,371
	December	239,508
2012	January	225,035
	February	231,138
	March	234,751
	April	234,751
	May	228,627
	June	231,689
	July	259,247
	August	273,128
	September	290,888
	October	295,991
	November	291,908
	December	281,702
2013	January	276,802
	February	279,252
	March	274,557
	April	270,821
	May	293,950
	June	303,135
	July	303,135
	August	303,135
	September	311,301
	October	284,253
	November	284,253
	December	277,619

Source: MIS/MOAI (2014).

Inflation and Exchange rate in Myanmar

Year	Month	Consumer Price Index (Jan. 2004 = 100)	Exchange Rate, Kyats/US\$
2004	January	1.000	884
	February	0.977	859
	March	0.970	849
	April	0.969	834
	May	0.976	888
	June	0.983	944
	July	0.997	950
	August	1.007	952
	September	1.016	947
	October	1.025	915
	November	1.035	953
	December	1.039	937
2005	January	1.048	911
	February	1.035	913
	March	1.044	914
	April	1.058	948
	May	1.063	985
	June	1.068	1,010
	July	1.078	1,068
	August	1.092	1,147
	September	1.117	1,234
	October	1.154	1,296
	November	1.172	1,202
	December	1.188	1,150
2006	January	1.156	1,136
	February	1.159	1,146
	March	1.176	1,187
	April	1.186	1,364
	May	1.233	1,298
	June	1.291	1,282
	July	1.325	1,326
	August	1.371	1,343
	September	1.395	1,369
	October	1.434	1,349
	November	1.488	1,398
	December	1.525	1,268
2007	January	1.557	1,292
	February	1.593	1,272
	March	1.631	1,275

	April	1.671	1,272
	May	1.711	1,268
	June	1.770	1,283
	July	1.806	1,295
	August	1.844	1,318
	September	1.872	1,373
	October	1.904	1,359
	November	1.932	1,294
	December	1.962	1,279
2008	January	2.137	1,253
	February	2.134	1,200
	March	2.159	1,115
	April	2.171	1,118
	May	2.232	1,139
	June	2.238	1,167
	July	2.280	1,183
	August	2.331	1,203
	September	2.338	1,263
	October	2.341	1,235
	November	2.312	1,262
	December	2.276	1,206
2009	January	2.235	1,124
	February	2.215	1,041
	March	2.200	1,027
	April	2.235	1,060
	May	2.243	1,079
	June	2.262	1,113
	July	2.292	1,129
	August	2.312	1,118
	September	2.336	1,095
	October	2.346	1,083
	November	2.345	1,011
	December	2.325	1,002
2010	January	2.354	1,014
	February	2.362	1,011
	March	2.369	1,000
	April	2.412	997
	May	2.442	990
	June	2.472	984
	July	2.475	994
	August	2.484	997
	September	2.487	958
	October	2.515	916

	November	2.541	903
	December	2.544	879
2011	January	2.552	847
	February	2.561	881
	March	2.579	881
	April	2.615	855
	May	2.625	827
	June	2.606	788
	July	2.580	792
	August	2.566	792
	September	2.562	791
	October	2.558	806
	November	2.569	782
	December	2.561	788
2012	January	2.552	816
	February	2.550	814
	March	2.551	813
	April	2.562	815
	May	2.578	835
	June	2.587	862
	July	2.597	870
	August	2.622	864
	September	2.668	850
	October	2.696	845
	November	2.711	844
	December	2.715	853
2013	January	2.693	855
	February	2.667	860
	March	2.671	869
	April	2.680	881
	May	2.694	905
	June	2.697	943
	July	2.713	980
	August	2.729	975
	September	2.733	970
	October	2.734	971
	November	2.738	983
	December	2.733	985

Source: IMF and CSO (for CPI) and www.exchangerate.com (for exchange rate).

Annex 2: Price Volatility

Price Return: Volatility of Pawsan Prices

	Nominal Prices					Real Prices				
	Yangon	Pathein	Mandalay	Myingyan	Average	Yangon	Pathein	Mandalay	Myingyan	Average
2004-2008	10.5	11.1	12.5	14.8	12.2	10.4	10.8	12.1	15.5	12.2
2009-2013	7.8	10.4	6.7	9.8	8.7	7.6	10.3	6.5	9.6	8.5
2004-2013	9.3	10.7	10.0	12.5	10.6	9.1	10.5	9.6	12.9	10.5

Price Return: Volatility of MWK Prices

	Nominal Prices					Real Prices				
	Yangon	Pathein	Mandalay	Myingyan	Average	Yangon	Pathein	Mandalay	Myingyan	Average
2004-2008	11.3	10.1	10.8	10.6	10.7	11.0	10.2	10.6	10.8	10.6
2009-2013	6.1	5.8	6.6	8.5	6.7	5.9	5.7	6.5	8.4	6.7
2004-2013	9.1	8.2	8.9	9.5	8.9	8.8	8.2	8.7	9.6	8.9

Price Return: Volatility of Emata Prices, Yangon

	Nominal Prices	Real Prices
2004-2008	6.1	6.0
2009-2013	5.2	5.1
2004-2013	5.7	5.6

Coefficient of Variation: Volatility of Pawsan Prices

	Nominal Prices					Real Prices				
	Yangon	Pathein	Mandalay	Myingyan	Average	Yangon	Pathein	Mandalay	Myingyan	Average
2004-2008	53	46	46	48	48	24	26	23	29	25
2009-2013	12	18	12	15	14	14	15	10	13	13
2004-2013	37	37	35	35	37	21	21	18	23	21

Coefficient of Variation: Volatility of MWK Prices

	Nominal Prices					Real Prices				
	Yangon	Pathein	Mandalay	Myingyan	Average	Yangon	Pathein	Mandalay	Myingyan	Average
2004-2008	52	42	39	47	45	26	24	21	33	26
2009-2013	9	14	17	17	14	8	13	13	14	12
2004-2013	35	32	32	39	34	23	22	19	25	22

Coefficient of Variation: Volatility of Emata Prices, Yangon

	Nominal Prices	Real Prices
2004-2008	44	19
2009-2013	10	9
2004-2013	32	17

**Price Return: Volatility of Thai and Vietnamese Export Prices,
25% broken**

	Thailand		Vietnam	
	Nominal Prices	Real Prices	Nominal Prices	Real Prices
2004-2008	8.9	8.7	8.9	8.7
2009-2013	8.1	8.2	7.0	6.9
2004-2013	8.5	8.4	7.9	7.8

**Coefficient of Variation: Volatility of Thai and Vietnamese Export
Prices, 25% broken**

	Thailand		Vietnam	
	Nominal Prices	Real Prices	Nominal Prices	Real Prices
2004-2008	49	47	49	36
2009-2013	13	13	13	17
2004-2013	34	33	34	30

Annex 3: Rice Market Integration in Myanmar

3.1 Analytical framework

1. **The study of price transmission (PT) for homogeneous commodities in space, or for a product as it is transformed along the stages of the marketing chain, has attracted the interest of agricultural economists for many decades** (Meyer and von Cramon-Taubadel 2004). Early empirical studies of PT were based on simple correlation and regression analyses that did not account for dynamics and lead-lag relationships in price data (Fackler and Goodwin 2001). In the course of the 1980s, these methods were increasingly replaced by dynamic regression models that include lagged prices (Ravallion 1986) and studies based on the concept of Granger causality (Gupta and Mueller 1982).

2. **The emerging cointegration literature highlighted several pitfalls associated with the regression analysis of price data.** In particular, since price data are often non-stationary, regression can lead to spurious results (Hassouneh *et al.* 2012). The basic insight of the cointegration approach is that to avoid the pitfall of spurious regression, one must test whether non-stationary prices series (also referred to as “integrated” price series) are not only correlated with one another but are also “co-integrated”. Cointegrated means that there exists a linear combination of the non-stationary series that is itself stationary: in other words, the series share a common form of non-stationarity and cannot drift apart indefinitely.

3. **Ardeni (1989) published the first study of PT in agricultural markets based on cointegration methods.** It is fair to say that with the exception of a comparatively small literature based on so-called parity bounds models (Barrett and Li 2002), essentially the entire empirical PT literature today draws on cointegration methods and, in particular, the so-called vector error correction model (VECM). The VECM is a re-parameterization of the standard vector autoregressive model (VAR), which relates the current levels of a set of time series to lagged values of those series. A simple VECM that captures the interactions between international or world prices and domestic price takes the following form:

$$(1) \quad \begin{aligned} \Delta p_t^d &= \varphi_1 + \alpha_1 \underbrace{(p_{t-1}^d - \beta_1 p_{t-1}^w)}_{\text{error correction term}} + \delta_1 \Delta p_{t-1}^w + \rho_1 \Delta p_{t-1}^d + \varepsilon_{1t} \quad (a) \\ \Delta p_t^w &= \varphi_2 + \alpha_2 \underbrace{(p_{t-1}^d - \beta_1 p_{t-1}^w)}_{\text{error correction term}} + \delta_2 \Delta p_{t-1}^w + \rho_2 \Delta p_{t-1}^d + \varepsilon_{2t} \quad (b). \end{aligned}$$

where p_t^d is the domestic price; p_t^w is the world price; and $\varphi, \alpha, \beta, \delta$, and ρ are parameters to be estimated.

4. **In matrix notation, and allowing for more than one lag of the price difference terms, this VECM can be written compactly as:**

$$(1) \quad \begin{bmatrix} \Delta p_t^d \\ \Delta p_t^w \end{bmatrix} = \begin{bmatrix} \varphi_1 \\ \varphi_2 \end{bmatrix} + \begin{bmatrix} \alpha_1 \\ \alpha_2 \end{bmatrix} \begin{bmatrix} 1 & \beta_1 \end{bmatrix} \begin{bmatrix} p_{t-1}^d \\ p_{t-1}^w \end{bmatrix} + \sum_{i=1}^k \begin{bmatrix} \delta_{1i} & \rho_{1i} \\ \delta_{2i} & \rho_{2i} \end{bmatrix} \begin{bmatrix} \Delta p_{t-i}^w \\ \Delta p_{t-i}^d \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{bmatrix}.$$

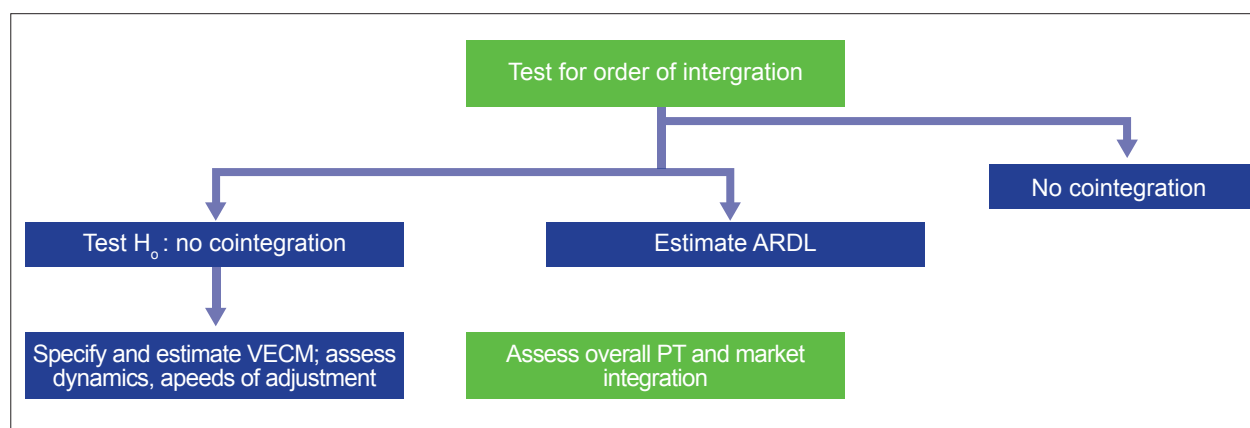
5. **From the perspective of empirical PT analysis, the main advantage of the VECM over the VAR is that it separates the long-run equilibrium (or cointegrating) relationship between p^w and p^d – which is captured by the error correction term $(p_{t-1}^d - \beta_1 p_{t-1}^w)$ – from the short-run dynamics that ensure that any deviations from this long-run equilibrium are corrected and thus only temporary.** The key parameters in the VECM are β_1 , which describes how one price reacts to changes in the other in the long run,²⁸ and the so-called “adjustment” parameters, α_1 and α_2 . If p^w and p^d are cointegrated, then α_1 and α_2 must have negative and positive signs, respectively. If this is the case, then if for example p^d

28 If estimation is based on prices in logarithms, then can be interpreted as the long-run elasticity of PT.

becomes too large relative to p^w and the error correction term is correspondingly positive, a decrease in p^d in the first equation of the VECM and an increase in p^w in the second equation, will drive the prices back towards their long-run equilibrium. One-to-one PT in the long run requires that $\beta_1 = 1$, while $0 < |\alpha_i| \leq 1$, with large (small) values of α_1 and α_2 indicating that errors are corrected rapidly (slowly).²⁹

6. Figure 15 outlines the basic empirical strategy for estimating PT. The first step is to determine whether the individual price series p^w and p^d are both non-stationary (also referred to as integrated or $I(1)$). This is usually carried out using the ADF (Dickey and Fuller 1979) and KPSS tests (Kwiatkowski *et al.* 1992). If the prices are not both $I(1)$, they cannot be cointegrated. If they are both stationary or " $I(0)$ " they can be studied using Auto-Regressive Distributed Lag models. If the series are both $I(1)$, the null hypothesis that they are not cointegrated can be tested using a two-step OLS procedure proposed by Engle and Granger (1987) or a maximum likelihood procedure developed by Johansen (1988). If the null of no cointegration is rejected, the VECM in equation (2) can be estimated, again using methods proposed by Engle and Granger or Johansen. Finally, the resulting estimates of β and α are interpreted.

Figure 15: Conceptual framework for assessing PT and market integration



Source: Greb et al. (2012).

3.2 Empirical analyses

Integration of international prices

7. The analysis of PT in Myanmar begins with the study of international integration. The first step is to test for the stationarity properties of the univariate time series. The ADF test is used to test the order of integration with the hypothesis of $H_0: \beta = 0$ vs. $H_1: \beta < 0$. Optimum lag length is determined based on the Akaike Information Criterion. Monthly data on nominal prices of Vietnam (FOB, 25% broken), Myanmar (Emata), and Myanmar (Manawthukha) denominated in US\$ are used to test the hypothesis. The results of the unit root test (with intercept and trend) indicate that all three time series are $I(1)$ implying that they can be cointegrated (Table 22) and providing a justification for using the first difference of the price series to conduct cointegration analysis.

²⁹ The speed of error correction captured by the magnitude of an adjustment parameter must be interpreted relative to the frequency of the data used to estimate it. An α of 0.4 estimated with annual data implies that 40 percent of any deviation from the long-run equilibrium is corrected within the space of one year. An α of 0.25 estimated with monthly data is smaller in magnitude but would nevertheless lead to over 95 percent correction of any deviation from the long-run equilibrium in the course of one year. Some authors transform α 's into so-called half-lives that indicate how many units of time are required for the correction of one-half of a deviation from the long-run equilibrium. An α of 0.25 estimated with monthly data corresponds to a half-life of 2.41 months.

Table 22: ADF test results: Vietnam and Yangon prices

Market pairs		2004-2013	2004-2008	2009-2013
		p-value	p-value	p-value
Vietnam	$\log(p)$	0.05	0.02	0.09
	$\Delta \log(p)$	0.01	0.03	0.01
Emata	$\log(p)$	0.66	0.03	0.34
	$\Delta \log(p)$	0.01	0.01	0.01
Manawthukha	$\log(p)$	0.81	0.07	0.98
	$\Delta \log(p)$	0.01	0.01	0.01

Source: Authors' estimates based on data from MIS/MOAI (2014) and FAO-GIEWS (2014).

8. The next step is the cointegration test. Cointegration is tested using the Johansen trace test. The summary in Table 23 shows a strong cointegration between both market pairs ($r^{\wedge} = 1$) for the period between 2004 and 2013. In both subperiods, before the global food price spike (2004-2008) and after the global food price spike (2009-2013), the cointegration is found to have been insignificant, with $r^{\wedge} = 0$. This result is likely to occur due to the short time price series (60 observations each) when divided into two subperiods. The results of the PT analysis are presented below for both subperiods, but they need to be interpreted with great caution given the insignificant results of the Johansen trace test.

Table 23: Johansen test trace results: Vietnam and Yangon prices

	H(r)	2004-2013			2004-2008			2009-2013		
		Q	p-val	r^{\wedge}	Q	p-val	r^{\wedge}	Q	p-val	r^{\wedge}
Manawthukha										
Vietnam - Yangon	0	23.89	0.01	1	14.32	0.27	0	12.93	0.38	0
	1	4.61	0.34							
Emata										
Vietnam - Yangon	0	21.49	0.03	1	14.62	0.25	0	13.55	0.33	0
	1	4.65	0.33							

Note: The hypothesis tested H(r): Number of cointegrating relationships $\leq r$, where $r = 0$ or $r = 1$, against H(2); Q denotes the value of the test statistics; p-val is the p-value; and r^{\wedge} is the estimated number of cointegrating relationships. Cointegrated pairs are bolded.

Source: Authors' estimates based on data from MIS/MOAI (2014) and FAO-GIEWS (2014).

9. The average PT elasticity (β) between Myanmar and Vietnam prices was 51 percent during 2004-2013 (Table 24). Prices of Emata and MWK rice behaved similarly in relation to Vietnamese export prices, underpinning the large share of MWK rice used for Emata assembled for export. A much stronger PT elasticity was detected during 2004-2008 than 2009-2013. It is surprising that the PT abruptly decreased to 10 percent with the opening of the economy during 2009-2013. But as discussed above, the results for subperiods should not be considered as statistically significant due to the weak power estimate (see Table 23).

Table 24: Estimates of PT elasticities between Myanmar and world markets

	2004-2013	2004-2008	2009-2013
Manwthukha			
Vietnam – Yangon	0.51	0.59	0.11
Emata			
Vietnam-Yangon	0.52	0.73	0.10

Source: Authors' estimates based on data from MIS/MOAI (2014) and FAO-GIEWS (2014).

10. The integration of the Yangon market of Emata and MWK with Vietnamese prices was apparently non-existent during 2004-2013. Table 25 shows the parameters of price adjustments: α_1 for an adjustment of Vietnamese prices to changes in Yangon prices and α_2 for an adjustment of Yangon prices to changes in Vietnamese prices. There was no significant adjustment in Yangon prices of both Emata and MWK to the changes in Vietnamese prices during either the whole study period or the two subperiods. On the other hand, Vietnamese prices reacted to changes in Yangon prices, increasingly so from 2009. When Yangon prices either increased or decreased, it took 6-7 months for Vietnamese prices to correct half of the price disequilibrium. But when Vietnamese prices changed, Yangon prices were not affected, pointing to the (still) weak integration of Myanmar with world markets.

Table 25: Estimates of the adjustment parameters between Yangon and Vietnam prices

Market pairs	2004-2013		2004-2008		2009-2013	
	α_1	α_2	α_1	α_2	α_1	α_2
Manawthukha						
Vietnam-Yangon	-0.16***	-0.03	-0.15***	-0.03	-0.21**	-0.06
Emata						
Vietnam-Yangon	-0.14***	0.00	-0.15***	-0.01	-0.21**	-0.05

Note: Asterisks indicate significance levels: *** 0.001 (strongest), ** 0.01, * 0.05, and non-existent (weakest).

Source: Authors' estimates based on data from MIS/MOAI (2014) and FAO-GIEWS (2014).

Integration of domestic prices

11. The results of the unit root test indicate that the all times series are $I(1)$ implying that they can be cointegrated (Table 26). This provides a justification for using the first difference of the price series to conduct cointegration analysis. Domestic prices are expressed in nominal Kyats.

Table 26: ADF test results: Domestic prices in Myanmar

	log (p)			$\Delta \log (p)$		
	2004-13	2004-08	2009-13	2004-13	2004-08	2009-13
Surplus markets						
Yangon-Pawson	0.76	0.38	0.09	≤ 0.01	≤ 0.01	≤ 0.01
Yangon-MWK	0.81	0.07	0.98	≤ 0.01	≤ 0.01	≤ 0.01
Patheingyi-Pawson	0.47	0.44	0.19	≤ 0.01	≤ 0.01	≤ 0.01
Patheingyi-MWK	0.50	0.96	0.44	≤ 0.01	≤ 0.01	≤ 0.01
Deficit markets						
Mandalay-Pawson	0.37	0.31	0.06	≤ 0.01	≤ 0.01	≤ 0.01
Mandalay-MWK	0.18	0.80	0.50	≤ 0.01	≤ 0.01	≤ 0.01
Myingyan-Pawson	0.42	0.47	0.27	≤ 0.01	≤ 0.01	≤ 0.01
Myingyan-MWK	0.47	0.96	0.34	≤ 0.01	≤ 0.01	≤ 0.01

Source: Authors' estimates based on data from MIS/MOAI (2014).

12. The results of the Johansen trace test indicate a mixed picture of cointegration. For Pawsan, only three market pairs are found to have been cointegrated during 2004-2013 (Table 27): Pathein-Mandalay, Pathein-Myingyan, and Mandalay-Myingyan. The situation is similar for MWK. As shown in Table 28, only three markets show signs of strong cointegration: Yangon-Myingyan, Pathein-Myingyan, and Mandalay-Myingyan. There are indications of the increased cointegration of more market pairs during 2009-2013, but the small sample size for the two subperiods does not provide strong enough justification to consider these results.

Table 27: Johansen test trace results: Pawsan prices

	H(r)	2004-2013			2004-2008			2009-2013		
		Q	p-val	\hat{r}	Q	p-val	\hat{r}	Q	p-val	\hat{r}
Yangon - Pathein	0	15.61	0.20	0	11.52	0.50	0	24.34	0.01	2
	1							10.04	0.03	
Yangon - Mandalay	0	15.43	0.21	0	10.71	0.58	0	35.34	0.00	2
	1							9.16	0.05	
Yangon - Myingyan	0	17.71	0.11	0	11.27	0.52	0	24.88	0.01	2
	1							9.97	0.03	
Pathein - Mandalay	0	30.33	0.00	1	24.36	0.01	1	19.29	0.07	0
	1	7.34	0.11		4.96	0.30				
Pathein - Myingyan	0	33.07	0.00	1	18.99	0.07	0	24.53	0.01	1
	1	8.42	0.07					7.68	0.10	
Mandalay - Myingyan	0	30.66	0.00	1	20.33	0.05	1	27.77	0.00	2
	1	6.99	0.13		4.26	0.39		12.51	0.01	

Notes: Similar explanation as for Table 23. Cointegrated pairs are in bold.

Source: Authors' estimates based on data from MIS/MOAI (2014).

Table 28: Johansen test trace results: Manawthukha prices

	H(r)	2004-2013			2004-2008			2009-2013		
		Q	p-val	\hat{r}	Q	p-val	\hat{r}	Q	p-val	\hat{r}
Yangon - Pathein	0	25.62	0.01	2	18.23	0.09	0	21.87	0.03	1
	1	10.95	0.02					6.56	0.16	
Yangon - Mandalay	0	19.61	0.06	0	15.27	0.22	0	31.27	0.00	1
	1							7.02	0.13	
Yangon - Myingyan	0	20.22	0.05	1	15.69	0.19	0	22.04	0.03	1
	1	8.06	0.08					7.08	0.13	
Pathein - Mandalay	0	39.78	0.00	2	28.63	0.00	1	17.03	0.13	0
	1	11.27	0.02		6.02	0.20				
Pathein - Myingyan	0	28.96	0.00	1	17.36	0.12	0	24.00	0.01	2
	1	7.52	0.10					9.82	0.04	
Mandalay - Myingyan	0	32.26	0.00	1	17.92	0.10	0	24.81	0.01	1
	1	8.33	0.07					8.58	0.06	

Notes: Similar explanation as for Table 23. Cointegrated pairs are in bold.

Source: Authors' estimates based on data from MIS/MOAI (2014).

13. The price integration of domestic market pairs is higher than the integration with world markets, but is still relatively weak. Only Mandalay and Myingyan prices (deficit markets) adjusted to the changes in Yangon and Pathein (surplus markets), with little transmission of price changes among other markets. For many market pairs, the integration did not exist at all. Where it existed, it was slow. When Pawsan prices in Yangon market changed during 2009-2013, half of this price change was passed to Mandalay prices only after five months. Market integration is generally weaker for Pawsan (Table 29) than for MWK (Table 30).

14. Overall, longer time series and probably better quality data are required to more precisely assess market integration in Myanmar. The data used in this report points to the existence of fractured markets inside the country and weak transfer of signals from deficit markets to surplus markets. This adds to rice price volatility in Myanmar.

Table 29: Estimates of the adjustment parameters of Pawsan prices

Market pairs	2004-2013		2004-2008		2009-2013	
	α_1	α_2	α_1	α_2	α_1	α_2
Yangon-Pathein	0.00	0.09*	-0.03	0.10	-0.15*	0.14
Yangon-Mandalay	-0.07	0.11	-0.05	0.16	0.00	0.16***
Yangon-Myingyan	-0.09	0.12	-0.14*	-0.01	-0.22*	0.26*
Pathein-Mandalay	-0.17	0.27**	-0.11	0.57**	0.10	0.15***
Pathein-Myingyan	-0.23***	0.24**	-0.33**	0.13	0.02	0.30***
Mandalay-Myingyan	-0.28***	0.13	-0.45***	-0.08	-0.30**	0.10

Note: Asterisks indicate significance levels: *** 0.001 (strongest), ** 0.01, * 0.05, and non-existent (weakest).

Source: Authors' estimates using the MIS/MOAI prices (2014).

Table 30: Estimates of the adjustment parameters of Manawthukha prices

Market pairs	2004-2013		2004-2008		2009-2013	
	α_1	α_2	α_1	α_2	α_1	α_2
Yangon-Pathein	-0.09	0.11	-0.24*	0.07	-0.17	0.13
Yangon-Mandalay	-0.02	0.12	-0.15	0.14	-0.13	0.42**
Yangon-Myingyan	-0.15***	-0.07	-0.22**	-0.09	-0.13	0.36**
Pathein-Mandalay	-0.07	0.39***	-0.21	0.56***	0.18	0.15*
Pathein-Myingyan	-0.29***	-0.08	-0.37***	-0.19	0.04	0.34***
Mandalay-Myingyan	-0.34***	-0.18*	-0.35***	-0.29**	-0.18	0.35**

Note: Asterisks indicate significance levels: *** 0.001 (strongest), ** 0.01, * 0.05, and non-existent (weakest).

Source: Authors' estimates using the MIS/MOAI prices (2014).



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