The agriculture sector provides for most employment opportunities and the primary source of comparative advantage in trade to many developing and least developed countries (LDCs). In spite of this, developing countries and LDCs have failed to increase their share in global agricultural exports, which has remained low at around 30 per cent. One of the reasons for this is attributable to excessive subsidies given to the agricultural sector in developed countries, raising their production and exports. The Agreement on Agriculture (AoA), negotiated in the 1986–94 Uruguay Round of multilateral trade negotiations, was a significant step towards addressing these trade-distorting farm subsidies through bringing them under the realm of international disciplines. As a result of the negotiations, agricultural subsidies were grouped according to the extent to which they distort production and global trade. All trade distorting subsidies were categorised under ‘Amber Box’ and hence had to be reduced. Other subsidies were listed under the ‘Green Box’ which meant that they did not distort production or trade, or at most caused minimal distortions. These were allowed to be retained and no maximum limit was imposed on green box (GB) subsidies. Over time, it has been observed that although subsidies in amber box have been substantially reduced by the developed countries, the decline has been more than compensated by the rise in GB subsidies.

This issue of Commonwealth Trade Hot Topics raises the question whether the agricultural subsidies categorised under ‘green box’ cause production and trade distortions. It reports the extent to which GB subsidies have increased over time in the European Union and the USA, and provides estimates of the extent to which they have led to rise in agricultural production and distorted global trade. It argues that there is a strong case for reopening the issue of domestic support provided under GB in the post-Bali work programme, and proposes broad principles which can be used to discipline GB subsidies.

### Extent of box-shifting in EU CAP and US Farm Acts

The EU has reformed its common agricultural policy (CAP) considerably in the last two decades to make it internationally more acceptable. For example, the MacSharry reforms of 1992 reduced market price support and introduced direct...
support. The decoupling of direct payments from production (Single Farm Payment – SFP) was encouraged in 2003 reforms. In the new CAP (2014–2020), the total amount allocated is 362.8 billion euros for the period 2014–2020, of which €277.8 billion (76.5%) will be spent on direct payments and market related expenditures.

It is interesting to note that the reforms in CAP in the EU have over time reduced the domestic support in amber box but steadily increased the subsidies in green box. These subsidies led to increase in agricultural production by lowering risks and increasing support to farmers. For example, the new CAP reforms have removed all the existing restrictions on production volumes especially for sugar, dairy and the wine sector. The new CAP provides producers of agricultural products with new risk insurance schemes including insurance schemes for crops, animals and plants and responsive safety net measures. Start-up aid will be given to young farmers, expenditures on innovation and training have been increased, and a new management toolkit introduced which includes mutual funds and income stabilisation tool. ‘Green direct payments’ have been introduced, which account for 30 per cent of the national direct payment envelope, and a special package of direct payments offered to small farmers. Direct payments are no longer based on uneven historical references, but are now based on converging per hectare payment at national or regional level.

Figure 1 depicts the box shifting of EU. Domestic support in amber box declined from €50 billion in 1995 to €30.8 billion in 2003 and further reduced to €6.5 billion in 2010. However, domestic support in green box increased from €9.2 billion in 1995 to €20.4 billion in 2003 and reached €68 billion in 2010. In 2010, the total domestic support provided under green box exceeded that provided under amber box in 1995. Most of the domestic support scheduled under the new CAP falls in the green box, with amber box support being only around 8 per cent of the total domestic support in the two boxes.

Like the EU, the USA Farm Acts have also experienced drastic changes over the last two decades. One of the major changes came in 1996, when it was decided to eliminate farm subsidies over the next seven years and alternatively offer direct payments to farmers based on the size of their land. The US Farm Act of 2002 included income support to growers of selected commodities, including wheat, feed grains, cotton, rice, oilseed, sugar and dairy. The income support was given largely through direct payments, counter-cyclical payments and marketing loans.

The Farm Bill of 2014 eliminates direct and counter-cyclical payments to farmers and in turn offers expanded crop insurance programmes for risk-management, which is a clear shift of subsidies from amber to green box. The two new programmes introduced are: Price Loss Coverage and Agriculture Risk Coverage. The farmers can choose between the two programmes. Price Loss Coverage pays out if crop prices fall too low, or if farm revenue falls below certain benchmarks. The reference price for assessing the fall in crop prices has been raised in the new Farm Bill than the parameters in the 2008 Farm Bill. Agriculture Risk Coverage (ARC) covers those losses which normally would not be covered by crop insurance. This is to maintain farm revenue and pays certain percentage of farm revenue if such revenue falls below historical benchmarks or ‘benchmark’ revenue. But these farm programmes are separate from a producer’s decision to purchase crop insurance. However, farmers selecting the Price Loss Coverage (but not ARC) are also eligible to
purchase an additional subsidised crop insurance policy to protect against ‘shallow losses’.

Further, to compensate cotton producers, a new crop insurance policy for cotton producers is introduced called Stacked Income Protection Plan (STAX) which is similar to Area Revenue Protection. It covers revenue losses of not less than 10 per cent and not more than 30 per cent of expected county revenue. Producers receive a premium discount equal to 80 per cent of the STAX premium, and on behalf of the producers an administrative and operative expense of 12 per cent of premium is paid to the crop insurance companies. Further, Farm Bill 2014 reauthorises many of the larger conservation programmes and makes available subsidised crop insurance to producers, who purchase a policy to protect against losses in yield, crop revenue, or whole farm revenue.

Figure 2 depicts the shifting of domestic support from amber box to green box in the period 1995–2010. The domestic support in amber box increased from US$6.2 billion in 1995 to $9.6 billion in 2002 and declined to $6.2 billion in 2008 and reached $4.1 billion in 2010. Meanwhile, green box subsidies increased from US$46 billion in 1995 to $58.3 billion in 2002, reaching $120 billion in 2010.

While environment payments have remained between 3–4 per cent of total green box domestic support from 1995 to 2010, food aid has increased from 65 per cent in 2002 to around 79 per cent of total green box subsidies in 2010. Expenditure on general services and decoupled payments has declined from 17 per cent and 9 per cent respectively of total GB subsidies in 2002 to 12 per cent and 5 per cent in 2010. Although it can be argued that food aid simply allows poor US citizens to feed themselves cheaply with food stamps, there are studies which argue this creates an artificial domestic demand leading to a rise in agricultural production. Further, Debar and Blogowski (1999) estimate for 1996 ‘the net equivalent aid to agricultural production’ of the US domestic food aid, on the following bases: (a) 88.4 per cent of US consumer purchases of food were of US origin in 1996; (b) the share of those purchases at the retail prices which went to farmers was 25 per cent; and (c) every dollar granted in food stamps induced a net additional consumption of food between 20 to 45 cents. The results show that ‘the net equivalent aid to agricultural production’ was US$2.6 billion in 1996, which was around 6.9 per cent of the domestic food aid value, a percentage which can be extrapolated to the other years. In 2010, this equivalent aid to agricultural production was US$6.6 billion which is more than the amber box subsidies in 2010.

The rising trend in domestic support measures in GB is not just limited to the USA and EU. Other developed countries have also increased their green box subsidies. The domestic support under green box has increased more than 150 per cent in Australia, around 75 per cent in Norway and more than 50 per cent in Switzerland and Canada. However, the amount of GB subsidies in these countries remains much lower than those given by the EU and the USA.

There is a growing theoretical and empirical literature on the extent to which these subsidies which are shifted from amber to green box distort production and trade. They operate through various routes but effectively lead to increased production through higher domestic support to farmers. The next section reports some of this literature.

Figure 2: Current Total AMS and Green Box Subsidies in USA (in Million USD): 1995–2010


Theoretical and empirical evidence of production and trade distorting impact of green box subsidies

Literature provides sufficient evidence on the favourable impact of GB subsidies on production and competitiveness of the developed countries. It is well established in the theoretical literature that the channels through which the decoupled payments under green box can affect production are (a) risk effects; (b) land price effects; (c) credit effects; (d) labour participation effects; and (e) expectations effect.

Decoupled payments can reduce the risks faced by farmers by increasing their wealth and making them less risk-averse and therefore produce more. Risk effects also distort international trade by reducing the degree of adjustment in domestic markets, increasing world price variability and forcing greater adjustments in other countries. This can therefore lead to negative insurance effect on other countries’ production and promote production and net trade in the country with decoupled payment support. Land price effects operate when the decoupled payments are capitalised into land values. Many studies have modelled this effect and its related implication for production and investments in agriculture. Ciaian and Kancs (2012)\(^3\) explore the capitalisation of Single Area Payment Scheme (SAPS) payments into land rents in the new EU member states for 2004 and 2005. They find that between 18 and 20 cents per euro of SAPS payments are bid into land rents.

Credit effects operate when subsidies under GB lower the cost of access to debt and affect farmers’ willingness to invest, generating additional production in future and potentially raising farmers’ credit worthiness and liquidity. Westcott and Price (2001)\(^4\) estimated the effects of the marketing loan programme on soybean production and found that soybean acreage increased due to marketing loans, resulting in higher production, lower prices and higher exports. Labour participation effects occur when farm households are induced to spend more time on farm and increase production (see Key and Roberts, 2009). Expectations effect occurs when farmers alter their production decisions to maximise their future payments from expected policy changes. Key et al. (2006)\(^6\) find that participation in government schemes, including the 1996 FAIR Act, increased plantings of programme crops among participants by 38 to 59 percentage points more than non-participants.

Impact of green box subsidies on agricultural productivity

A recent paper by Banga (2014) uses Data Envelopment Analysis (DEA) for estimating the impact of green box subsidies on agricultural total factor productivity (TFP). The approach adopted is to consider subsidies as an additional output along with the total agricultural output produced. Since these subsidies are decoupled from production, they are like additional incomes or wealth in the hands of the farmers in the form of decoupled payments, concessional loans, general services provided or risk covered which may be linked to ability to invest more. Comparison of TFP in agriculture is made with and without subsidies.

The analysis is undertaken for 26 countries for the period 1995–2007 and total factor productivity is estimated using Malmquist indices.\(^7\) The results of DEA analysis show that agricultural productivity increases substantially with GB subsidies. Maximum increase in GB subsidies has been experienced by the EU. Accordingly, the results show that in EU, TFP growth in agriculture is 3.7 per cent per annum without GB subsidies but it increases to 8.3 per cent per annum with GB subsidies in the period 1995–2007. In other words, rise of an average 4.6 percentage points per annum in agricultural productivity can be attributed to green box subsidies in EU in the period 1995–2007. For the USA, the increase in GB subsidies was US$30 billion in this period, which increased total factor productivity from 2.6 per cent per annum to 6.8 per cent per annum, an increase of an average 3.9 percentage points per annum. This implies that over the 13 years, agricultural productivity increased around 60 per cent in EU and 51 per cent in USA on

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\(^2\) For a detailed review of literature and empirical evidence see Banga (2014).


\(^7\) For details of the methodology, see Banga (2014).
account of GB subsidies. This result corroborates the survey results arrived at by the German Federal Agricultural Research Centre (FAL) in 2005 on a sample of farms in Germany, which showed that the investment aids provided increased the productivity of the farms by 40–73 per cent.

Estimating year to year agricultural productivity change in the EU, DEA analysis found that GB subsidies as a proportion of total value added in agriculture increased from less than 10 per cent in 2000 to 38 per cent in 2007 – pulling up total factor productivity growth from 2.7 per cent in 2001 to 11.4 per cent in 2007, while this would have been at 5 per cent in 2007 without green box subsidies. Post 2003 reforms, GB subsidies have contributed more to agricultural productivity as compared to earlier CAP programmes. In 2014–2020, planned GB subsidies are much higher and therefore will have much greater impact on agricultural productivity and thereby agricultural production.

Similar analysis of year to year growth in agricultural productivity shows that in the USA, GB subsidies as a ratio of total value added in agriculture increased from 42 per cent in 2000 to 63 per cent in 2007. TFP growth increased from -2.1 per cent in 2002 without green box support to 10.7 per cent with GB support. In 2007, productivity growth without GB subsidies would have been -8.9 per cent but with GB subsidies it was -1.3 per cent. The spurt in GB subsidies post-2005 helped in sustaining agricultural productivity growth in the USA post-2005.

**Impact of green box subsidies on agricultural production and international trade**

Banga (2014) estimates the impact of GB subsidies on production, export and import volumes, export revenues and import costs using the Agricultural Trade Policy Simulation Model (ATPSM).

To estimate impact of removal of GB subsidies of the EU and the USA (as they comprise bulk of GB subsidies), two simulations were undertaken. The results of the first simulation, that is, cutting GB subsidies by 40 per cent in USA (excluding food stamps) and 50 per cent in EU (decoupled payments), show that these cuts could lead to major restructuring of agricultural production and trade where production and exports shift towards more competitive producers in developing countries. Following the cuts, imports rise in developed countries by 22 per cent while production falls by 5 per cent; contrary to this, exports of developing countries rise by 12 per cent and export revenue increases by 17 per cent. Least developed countries do not experience any rise in their import costs; in fact, export volume and export revenue increase in LDCs by 9 per cent and 8 per cent respectively, while imports fall by 4 per cent. Net food importing countries (NFICs) are also not unfavourably affected as their import costs fall.

Another reason why attention must be drawn to this box shifting and increasing value of green box subsidies is that the results of the second simulation, that is, capping of GB subsidies of the USA and EU to 2001 level, show that such a capping will result in substantial gains to developing countries as well as LDCs and NFICs in terms of agricultural production and trade. Agricultural production increases by 3–5 per cent in developing regions while export revenues increase by 55 per cent in developing countries and 25 per cent respectively. Agricultural production in the USA falls by 15 per cent and that of the EU by 19 per cent – while their agricultural imports rise by 200 per cent and 85 per cent respectively.

**Conclusions**

The above results indicate that GB subsidies have increased agricultural production in and exports of developed countries, and thereby put developing countries and other efficient producers at a disadvantage.

There is an urgent need to bring GB subsidies under international disciplines. Capping GB subsidies to avoid any further box shifting of subsidies is required to stop the artificial rise in competitiveness of developed countries which is created by GB subsidies. Some of the broad principles for disciplining GB subsidies can include: capping total green box expenditures of developed countries; limiting or completely eliminating subsidies provided under decoupled payments; allowing direct payments only in case of natural disasters and/or otherwise where production loss has been above a threshold level; making structural adjustment programmes time-bound; and strengthening the review mechanism to ensure that expenditures categorised under green box satisfy the basic principle of being minimally production and trade distorting.
International Trade Policy Section at the Commonwealth Secretariat

This Trade Hot Topic is brought out by the International Trade Policy (ITP) Section of the Economic Policy Division of the Commonwealth Secretariat, which is the main intergovernmental agency of the Commonwealth – an association of 53 independent states, comprising large and small, developed and developing, landlocked and island economies – facilitating consultation and co-operation among member governments and countries in the common interest of their peoples and in the promotion of international consensus-building.

ITP is entrusted with the responsibilities of undertaking policy-oriented research and advocacy on trade and development issues and providing informed inputs into the related discourses involving Commonwealth members. The ITP approach is to scan the trade and development landscape for areas where orthodox approaches are ineffective or where there are public policy failures or gaps, and to seek heterodox approaches to address those. Its work plan is flexible to enable quick response to emerging issues in the international trading environment that impact particularly on highly vulnerable Commonwealth constituencies – lease developed countries (LDCs), small states and sub-Saharan Africa.

Scope of ITP Work

ITP undertakes activities principally in three broad areas:

- It supports Commonwealth developing members in their negotiation of multilateral and regional trade agreements that promote development friendly outcomes, notably their economic growth through expanded trade.
- It conducts policy research, consultations and advocacy to increase understanding of the changing international trading environment and of policy options for successful adaptation.
- It contributes to the processes involving the multilateral and bilateral trade regimes that advance more beneficial participation of Commonwealth developing country members, particularly, small states and LDCs and sub-Saharan Africa.

ITP Recent Activities

ITPs most recent activities focus on assisting member states in their negotiations under the WTO’s Doha Round and various regional trading arrangements, undertaking analytical research on a range of trade policy, emerging trade-related development issues, and supporting workshops/dialogues for facilitating exchange of ideas, disseminating informed inputs, and consensus-building on issues of interest to Commonwealth members.

Selected Recent Meetings/Workshops Supported by ITP

5-7 November 2014: Launch of the Publication on Regional Integration in South Asia: Trends, Prospects and Challenges at the 7th South Asia Economic Summit (SAES VII: Towards South Asia Economic Union, held in New Delhi, India
14-15 October 2014: LDC IV Monitor’s Launch of the Publication on the Implementation of Istanbul Programme of Action for LCDs, held in New York, USA
5-6 May 2014: Regional Meeting on ‘WTO and Post Bali Agenda’, held in Dhaka, Bangladesh
28-29 April 2014: Regional Meeting on ‘WTO and Post Bali Agenda’, held in Accra, Ghana
24-25 April 2014: Regional Meeting on ‘WTO and Post Bali Agenda’, held in Nairobi, Kenya
10-11 December 2013: Regional Workshop on ‘South–South Trade and Regional Value Chains in Sub Saharan Africa’, held in Nairobi, Kenya
4 December 2013: WTO MC9 side event: Discussion Session on the Future of Aid for Trade, held in Bali, Indonesia
3 December 2013: WTO MC9 side event: UNCTAD-Commonwealth session on Reflections on Global Trade: From Doha to Bali and Beyond, held in Bali, Indonesia
Selected ITP Publications


Selected Ongoing Policy Research Projects

- Multilateral trade negotiations – specific issues for LDCs, SVEs and SSA
- The development impact of the Doha Round on least developed countries (LDCs)
- Aid for trade in small states and Sub-Saharan Africa
- Rise of emerging developing countries and implications for Sub-Saharan Africa and small vulnerable economies (SVEs)
- Mega trading blocs and implications for LDCs, SVEs and SSA
- Development issues under EPAs
- Trade in services
- Regional trading arrangements in South Asia and their implications
- Trade in services issues for small states and low-income countries
- Implementation of the Istanbul Programme of Action for LDCs
- Intra-Commonwealth trade & development cooperation
- Non-tariff barriers in South Asia and Sub-Saharan Africa
- Global value chains and the effective participation of LDCs, SVEs and SSA
- LDCs and SVEs in South-South trade