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journal homepage: [www.elsevier.com/locate/jep](http://www.elsevier.com/locate/jep)Power, policy and the *Prunus africana* bark trade, 1972–2015A. Cunningham<sup>a,\*</sup>, V.F. Anoncho<sup>b</sup>, T. Sunderland<sup>c</sup><sup>a</sup> School of Plant Biology, University of Western Australia, 35 Stirling Highway, Crawley Perth, Western Australia 6009, Australia<sup>b</sup> Mankon Bamenda, Cameroon<sup>c</sup> CIFOR, Jalan CIFOR, Situ Gede, Bogor, Jawa Barat, 16000 Indonesia

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## ABSTRACT

**Ethnopharmacological relevance:** After almost 50 years of international trade in wild harvested medicinal bark from Africa and Madagascar, the example of *Prunus africana* holds several lessons for both policy and practice in the fields of forestry, conservation and rural development. Due to recent CITES restrictions on *P. africana* exports from Burundi, Kenya and Madagascar, coupled with the lifting of the 2007 European Union (EU) ban in 2011, Cameroon's share of the global *P. africana* bark trade has risen from an average of 38% between 1995 and 2004, to 72.6% (658.6 metric tons) in 2012. Cameroon is therefore at the center of this international policy arena.

**Methods and materials:** This paper draws upon several approaches, combining knowledge in working with *P. africana* over a 30-year period with a thorough literature review and updated trade data with “ground-truthing” in the field in 2013 and 2014. This enabled the construction of a good perspective on trade volumes (1991–2012), bark prices (and value-chain data) and the gaps between research reports and practice. Two approaches provided excellent lenses for a deeper understanding of policy failure and the “knowing-doing gap” in the *P. africana* case. A similar approach to Médard's (1992) analyses of power, politics and African development was taken and secondly, studies of commodity chains that assess the power relations that coalesce around different commodities (Ribot, 1998; Ribot and Peluso, 2003).

**Results:** Despite the need to conserve genetically and chemically diverse *P. africana*, wild populations are vulnerable, even in several “protected areas” in Burundi, Cameroon, the Democratic Republic of Congo and in the forest reserves of Madagascar. Secondly, hopes of decentralized governance of this forest product are misplaced due to elite capture, market monopolies and subsidized management regimes. At the current European price, for *P. africana* bark (US\$6 per kg) for example, the 2012 bark quota (658.675 t) from Cameroon alone was worth over US\$3.9 million, with the majority of this accruing to a single company. In contrast to lucrative bark exports, the livelihood benefits and financial returns to local harvesters from wild harvest are extremely low. For example, in 2012, the 48 active harvesters working within Mount Cameroon National Park (MCNP) received less than 1US\$ per day from bark harvests, due to a net bark price of 0.33 US\$ per kg (or 43% of the farm gate price for wild harvested bark). In addition, the costs of inventory, monitoring and managing sustainable wild harvests are far greater than the benefits to harvesters.

**Conclusion:** Without the current substantial international donor subsidies, sustainable harvest cannot be sustained. What is required to supply the current and future market is to develop separate, traceable *P. africana* bark supply chains based on cultivated stocks. On-farm production would benefit thousands of small-scale farmers cultivating *P. africana*, including local women, for whom wild harvesting is too onerous. This change requires CITES and EU support and would catalyze *P. africana* cultivation in across several montane African countries and Madagascar, increasing farm-gate prices to harvesters compared to economic returns from wild harvest.

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## 1. Introduction

More wild harvested bark is internationally traded from *Prunus africana* than from any other African medicinal plant species. *P. africana* is widely used in African traditional medicine. In Cameroon, West Africa, *P. africana* was the fourth most popular medicinal

\* Corresponding author.

E-mail address: [tonyc05@bigpond.net.au](mailto:tonyc05@bigpond.net.au) (A. Cunningham).

plant species amongst people interviewed around Mount Cameroon, and was collected by 14% of households surveyed (Jeanraud, 1991). Similarly, it is an important medicine in the Kilum-Ijim area, where it is used to treat malaria, stomach ache and fever (Nsom and Dick, 1992). In East Africa, the bark is pounded, water added and taken to treat stomach-ache and is not only used by traditional healers, but also by local people collecting their own medicinal plants, including for use as a purgative for cattle (Kokwaro, 1976). In southern Africa, the bark is a treatment for inter-coastal pain (Pujol, 1990). It was the use of *P. africana* bark by Zulu men in the Vryheid area of KwaZulu/Natal, South Africa to treat difficulties in passing urine that first drew the attention of a German medical doctor to the potential wider use to treat benign prostatic hypertrophy (BPH), who then mentioned this potential to Jacques Debat in the 1960's (E. Legendre, Pers. Comm. to TC, 1997). Follow-up by Jacques Debat resulted in the early patent (Debat, 1966) and stimulated the trade we know today. International attention was initially drawn to *P. africana* following a review of the extent of trade in Cameroon and elsewhere (Cunningham and Mbenkum, 1993). Prior to 1992, little attention was given to the *P. africana* trade, despite an export trade from Africa to Europe that commenced in the early 1970's. Since CITES Appendix II listing in 1995, however, over 50 research publications and 13 post-graduate theses, the majority by Cameroonian graduates, have been produced on *P. africana* (e.g. Anoncho (2014), Avana (2006), Bellewang (2006), Buchwaldt (1996), Duone (2008), Ekane (2005), Ingram (2014), Ndam (1998), Nkeng (2009), Ntsama (2008), Stewart (2001), Tassé (2006) and Wazinski (2001)). Yet there remains a major divide between these research products and practical conservation action. Knight et al. (2008) and Habel et al. (2013) refer to this as the 'knowing-doing gap', where credible and peer-reviewed research results are not translated into practical management. In 2007, due to concerns about unsustainable wild harvest, the European Union (EU) instituted an import ban on *P. africana* bark, based on the "Non-detriment findings" (NDF) component of Article 4 of EU Regulation No. 338/97. In 1995, when *P. africana* was added to Appendix II of the Convention on International Trade in Endangered Species (CITES), this was a high profile decision as most (95%) of the 1398 t exported from Cameroon was to Europe (mainly France (68.7%) and Spain (26.6%)). In 2012, due to zero quotas granted by CITES to Burundi, Equatorial Guinea, Kenya and Madagascar, Cameroon currently supplies 72.6% of the global supply of *P. africana* bark (658.7 t), the remainder coming from Uganda (176.2 t) and the Democratic Republic of Congo (72 t), (CITES, 2012).

Despite the ecological values of *P. africana* in globally significant conservation areas, including in the diet of rare and often endemic birds and primates such as red colobus (Chapman and Chapman, 1999; Chapman et al., 2003) and black-and-white colobus (Fashing, 2004), there is growing pressure for commercial *P. africana* harvest in the Albertine Rift. Cameroon's National Plan for *P. africana* (Ingram et al., 2009), which included commercial bark harvests in Mount Cameroon National Park, is being considered as a model for replication elsewhere. Examples of this are the inventory of *P. africana* stocks in Kibira National Park, Burundi (Betti et al., 2013) and commercial *P. africana* harvest adjacent to Kahuzi-Biega and Virunga National Parks in the eastern DRC. We suggest that it is time for a reality check with regard to the wild harvest of *P. africana*. This paper therefore centers around four questions:

- (i) What can we learn from the *P. africana* case in terms of bridging the gaps between science and the practice of sustainable use and conservation?
- (ii) How "sustainable" is sustainable harvest? In other words, how does *P. africana* compare in terms of costs vs. benefits of sustainably managed bark harvests?

- (iii) Given that most bark commercially harvested for large-scale export for a wide range of other species has made the shift from wild harvest to on-farm production, and that thousands of Cameroonian farmers have cultivated *P. africana* since the late 1970's, why has not the shift to commercial trade from cultivation occurred in the case of *P. africana*?
- (iv) How have national and international policies and trade influenced the shift from over-exploitation to the purported sustainable harvest of *P. africana* (national bans, CITES Appendix II listing and the 2007 EU ban)?

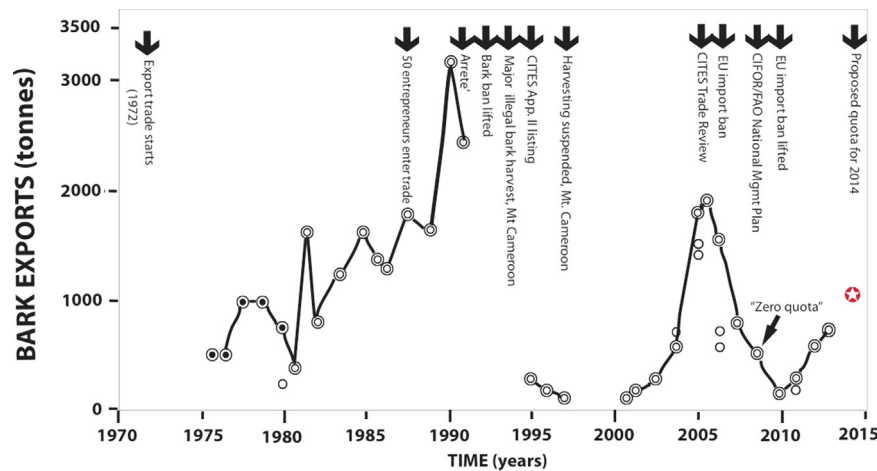
## 2. Methods

We used several approaches in this study, combining our experience in working with *P. africana* over a 30-year period with a thorough literature review and updated trade data with "ground-truthing" in the field in 2013 and 2014. This enabled us to get a perspective on trade volumes (1991–2012), bark prices (and value-chain data) and the gaps between research reports and practice. Understanding why there is a "knowing but not doing" gap in the *P. africana* case requires scrutiny beneath the surface of national "policy theater", where there is considerable "talking but not doing". Understanding the links between capital accumulation and political power is a key. The role of political elites is converting natural resources into political and financial capital is well known since Sahlins (1963) seminal study of "big men" in Melanesia and Polynesia. Two approaches provided us with excellent lenses for a deeper understanding of policy failure and the "knowing-doing gap" in the *P. africana* case. Firstly, we took a similar approach to Médard's (1992) analyses of power, politics and African development. Secondly, studies of commodity chains that assess the power relations that coalesce around different commodities (Ribot, 1998; Ribot and Peluso, 2003), similar to the approach used to study *P. africana* trade in Madagascar (Neimark, 2010). In South-west Cameroon, "ground-truthing" involved fieldwork and discussions with a range of people involved with *P. africana*, including harvesters, local *P. africana* farmers, national park managers and donor-funded researchers in the Mount Cameroon area in 2014. In North-west Cameroon, one of us (VFA) also conducted focused group discussions followed by detailed interviews with 27 resource persons. These respondents were selected from different categories of people involved in the *P. africana* trade (five government representatives, seven NGO administrators, 10 farmers/harvesters, four heads of community forests and one bark exporter). It was clear from our literature review that most previous research had focused either on ecological research, cultivation or genetic studies of *P. africana*. A few policy analyses have been done specifically on *P. africana* trade in Cameroon (Cunningham and Cunningham, 2000; Page, 2003) or Madagascar (Neimark, 2010), with only one desk-top study (Samndong, 2010) and one field study (Anoncho, 2014) carried out after the 2007 EU ban on trade and release of the National Management Plan for *P. africana* in Cameroon (Ingram et al., 2009).

## 3. Results

### 3.1. The "knowing doing" gap

On the surface, the "knowing-doing gap" for *P. africana* seems relatively insignificant compared to the chasm between research effort vs. effective conservation action on rhinoceros species (see, for example, Linklater, 2003). Nearly 40 years ago, the government of Cameroon expressed concern about overexploitation of internationally traded medicinal plants (United Republic of Cameroon,



**Fig. 1.** Bark exports from Cameroon over 40 years, showing some of the main policy interventions. No trade data were available for the periods 1991–1994 and 1998–2000. Based on a bark yield of 55 kg per tree, a 1000 t annual quota represents 18,000 trees debarked/year using the “quarter method”. Although the EU ban was in place from 2007 to December 2010, when a 150 t quota was permitted, exports continued, including in 2009 when the Minister of Forestry had declared a “zero quota”. Despite concerns about sustainable harvest, a 1092 t quota (worth US\$6.5 million at the current price of US\$6 per kg) has been proposed by ANAFOR.

1976). In 1991, *P. africana* harvests in Cameroon were halted by national legislation (Ministry of Agriculture, 1991). In 1983, the local prefecture declared a harvest ban on *P. africana* for the Kilum forest. District level bans were also declared in 1997 (Ijim forest), 1998 (Mount Cameroon), 1999 (South-west region), 2005 (E26/PS/126 Prefectural Order No. 17/2005) and 2006 for Oku forest (E26.03/GSB/19/S.1/288 Sub-Prefectural Decision No. 3). In addition, traditional leaders have also banned trade due to destructive harvest, with a ban currently in place in Oku area (2014). This action at the national and district levels was followed by international legislation due to concerns about unsustainable wild harvest, with CITES Appendix II listing (2005) and the EU ban on importation (2007) linked to implementation of CITES in the EU (Council Regulation (EC) No. 338/97 9 December 1996 on the protection of species of wild fauna and flora) (Fig. 1).

With generous donor support, initiatives to reduce the huge scale of illegal *P. africana* bark exploitation that occurred on Mt. Cameroon in between 1993 and 1996 were relatively successful. On Mt. Cameroon, *P. africana* inventories, management plans and monitoring processes were implemented in which a local institution (the Mount Cameroon Prunus Management Common Initiative (MOCAP)) is integrally involved. As we discuss later, however, understanding the links between capital accumulation and political power and the actions of “political entrepreneurs” is crucial for the design of lasting solutions to sustainable harvest of valuable natural resources. Ground truthing shows the extent of the gap between rhetoric and reality regarding sustainable harvest of *P. africana* (Table 1).

In addition, the livelihood benefits from *P. africana* have been largely exaggerated. Claims in the National Management Plan such as “the contribution of *Prunus africana* to local communities and individual households in the main producing areas of the North West and South West of Cameroon has been significant over the last three decades” (Ingram et al., 2009) and that “for harvesters, *Prunus africana* is generally very profitable, equivalent to 3100 FCFA (7.03 US \$) per day, well over a 2 US\$ a day poverty line” (Ingram, 2014) need reconsideration. In reality, *P. africana* bark harvests benefit just 0.0004% of the local population around Mt Cameroon. No local people benefit directly from commercial bark exploitation from Tchabal Mbabo, as all harvesters are outsiders to the area (Green, 2005). Annual per capita income to harvesters is between \$356 (our study) and \$374 (Ingram, 2014), an average of 0.98–1.02US\$ per day. In SW, W & NW Cameroon, households benefit from

diverse assets, including migrant remittances, on-farm production and many NTFP's aside from *P. africana*. In contrast, a tiny minority of well-connected elites secures most of the benefits. Prices paid to wealthy elite exporters (currently US\$6 per kg, compared to 0.33 US\$ per kg or less paid to harvesters (Fig. 2) are withheld from bark harvesters and MOCAP.

With *P. africana*, a slow growing species subject to destructive harvest, it could be argued that neither the 1-year ban (1991–1992) nor the EU ban, which barely lasted three years, have been long enough periods to allow wild populations to recover from decades of destructive harvest.

### 3.2. The shift from sustainable local use to unsustainable commercial wild harvest

The *P. africana* trade in Cameroon can be divided into five phases after the transition from local traditional use (pre-1970's) to commercial trade.

Phase 1 (1976–1986), when Laboratoire Debat (later Plantecam Medicam, then Plantecam) held a monopoly over harvesting and export, using a core team of trained harvesters.

Phase 2 (1987–1994), when commercial harvest was opened to 50 Cameroonian entrepreneurs. Plantecam still controlled the export, but wild *P. africana* populations in NW and W Cameroon, and enrichment plantings implemented by Plantecam near Dschang, were plundered. From 1993, with accessible wild stocks depleted, harvesters from W and NW Cameroon started to exploit *P. africana* on Mt Cameroon, in addition to local Bakweri harvesters already operating there. It was during this period that the partial ban on harvest occurred (1991), but this had the opposite effect, with twice annual average amount of bark harvested, bought from local entrepreneurs and exported by Plantecam (Cunningham and Mbenkum, 1993). In 1994, new forestry regulations were introduced in Cameroon. These included classifying *P. africana* as a Special Forestry Product. Controls were put in place over harvest and export through annual, non-renewable, tonnage based exploitation permits for dried bark harvested within specific zones allocated (Fauna and Fisheries Regime (Law No 94/01 of January 20th, 1994) and Decree No 94/436 (August, 23rd 1994).

Phase 3 (1995–2006): In 1994, Kenya nominated *P. africana* for CITES App. II listing and was passed in 1995. This required monitoring of *P. africana* trade and the species was placed on the IUCN Red List (as Vulnerable (A1cd)).

**Table 1**  
Examples of the gap between rhetoric and reality on key themes related to *P. africana* harvest.

Theme	Rhetoric	Reality
<b>A 5 year rotation times after first bark harvest</b>	Sustainable harvest of 50% of trunk bark using the “quarter method” needs to be based on a 5-year rotation. This is the basis of the 5 blocks of the Prunus Allocation Unit (PAU) within Mt Cameroon National Park (Eben-Ebai, 2011). One of the reasons for the massive over-estimate of bark yield from Mt Cameroon (4438 t/yr) (Ewusi et al., 1996) was the assumption of a 4-year rotation.	The five-year rotation is too short. A detailed study by Nkeng (2009) found that at least a seven-year rotation was necessary. If wild harvest continues, a 7–8 year minimum rotation is needed. The challenge is that longer rotation times mean significantly lower annual bark harvests. For Mt. Cameroon, Eben-Ebai (2011) has calculated a 6 years rotation yields 297,902 t vs. 377,482 t of fresh bark. 21% less bark than from a 5 yr rotation. In contrast to Ewusi et al. (1996) “high estimate” of 4438 t/yr from Mt. Cameroon, the 2012 annual bark yield from Block 1 was only 57 t. With a 7-year rotation, this would be further reduced to less than 40 t per year (a 100 times less than Ewusi et al. (1996) estimate).
<b>The “two bark quarters” technique is sustainable.</b>	Only trees with diameter at breast height (dbh) > 30 cm can be debarked. Trees with dbh < 50 cm should be debarked with two strips in opposite sides, each no wider than 1/4 of the tree circumference. Lateral roots with a minimum diameter of 20 cm on trees > dbh 50 cm can be debarked. Each debarked tree should completely recover before subsequent debarking (Ministry of Agriculture 1986; Ndibi and Kay, 1997)	In moist sites, bark regrowth occurs if this technique is used, but in dry sites, bark does not recover. In lower altitude sites, even healthy <i>P. africana</i> trees are attacked by wood-boring beetles. Debarking is often followed by reduction in tree crown size due to shoot and branch die-off as a result of water stress due to 50% bark loss (Cunningham and Mbenkum, 1993; Nkeng et al., 2009; Foham et al., 2009). Water stress is exacerbated by root debarking. In most cases, far more bark is taken than recommended: “Despite training and the best practice standards and decree, the majority (61%) of trees in all the main harvest zones surveyed were debarked unsustainably. .... Only 9% were harvested according to the Two Quarters technique, mainly in privately-owned plantations and some areas of Mt. Cameroon controlled by MOCAP-CIG (Ingram et al., 2009)”. Even so, even “correct” bark stripping damages the cambium and inhibits bark regeneration.
<b>Inventories &amp; quota setting</b>	“...data sources were combined [to] create a management plan which proposes a quota on the basis of inventories, verifies harvesting techniques and contains realistic control and monitoring regulations” (Ingram et al., 2009)	The National Management Plan cobbled together inventories that had used different methods, with very different results, even for the same locations. Recommendations that inventories take tree crown health into account (Nkeng, 2009; Navarro-Cerrillo and Muñoz) were not followed. The best managed site is the PAU in Mt Cameroon National Park. Previous sampling to establish yields has varied hugely for Mt. Cameroon, from 4438 t/yr to 330 t/yr to 178 t/yr and an actual yield in 2012 of just 57 t. To avoid inaccurate estimates, GiZ/KfW recently supported a 100% inventory. This cost 15 million CFA (around US\$30,000) compared to a bark harvest worth \$17,100 in 2013.
<b>Sampling methods</b>	<i>Adaptive Cluster Sample method (ACS) is widely considered to be best method for wild Prunus africana populations</i> (Betti, 2011; Betti et al., 2013; Ingram et al., 2009)	Two concerns about the National Management Plan are firstly, that inventories were based on very different sampling methods and secondly, that the ACS overestimates plant populations (Morrison et al., 2008). Based on a comparison of 5 different sampling designs, grid-based systematic designs were more efficient and practical than ACS or other methods.
<b>Participatory, decentralized management.</b>	<i>The Prunus Allocation Units (PAUs) have been participatively defined and developed with input from stakeholders, particularly during Prunus Platform meetings, community forests, SNV and the Forest Governance Facility from 2007 to 2009</i> (Ingram et al., 2009).	As MINOF does not allocate enough funds for inventories and management plans in PAU's, these are either funded by donors (MCNP), ITTO (eg: Tchabal Mbabo) or by permit holders who export bark and directly fund ANAFOR staff. Instead of wider participation and devolution of power, centralized control continues through complex permitting processes, with concentration of power through exporter elites. In 2007, just nine companies received quotas, one of which (Afrimed) continues to dominate the export trade (Fig. 2).

Phase 4 (2007–2010): The EU ban in 2007 was necessary to enable *P. africana* stocks to recover, created serious concerns amongst exporter elites, European pharmaceutical companies and high level MINFOF policymakers. By the time of the EU ban, the lack of a separate supply chain for cultivated *P. africana* bark had resulted the concentration of power over *P. africana* production through wild harvest (Fig. 3), rather than devolving profits and production to the thousands of farmers who cultivate *P. africana*. Based on interviews carried out in NW Cameroon, 80% of the actors said they know why the EU trade ban implemented (Anoncho, 2014). Awareness about the reasons for the ban is high (poor *P. africana* management, no evidence of sustainable exploitation, Cameroon not respecting the attributed quota, and the quality exported was not the best due to bark substitution). Those most affected by EU ban were a powerful Cameroonian elite and the European pharmaceutical companies processing *P. africana* bark. The result was a process of lobbying, advocacy to overturn the

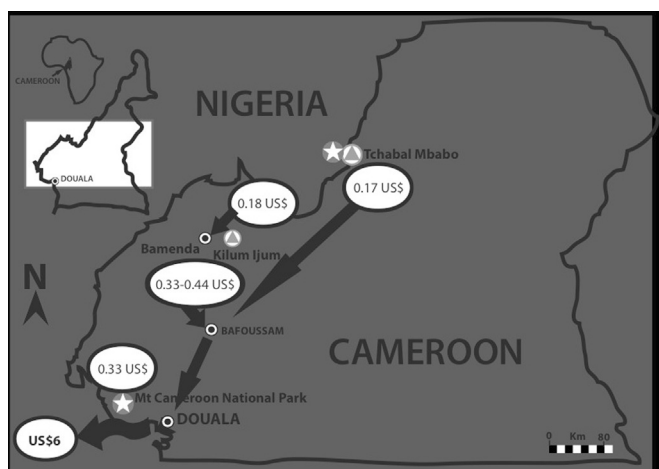
ban: a mutiny over the bounty characterized by advocacy dressed up as research (Table 2).

Phase 5: 2011 and beyond. The question remains on how to go forward following advocacy and lobbying that overturned an effective international policy instrument (the EU ban on trade) that would have allowed *P. africana* stocks to recover? Instead of decentralization through local participation that was supposed to occur under the National Management Plan (Ingram et al., 2009), power and profits from commercial *P. africana* harvest are now in the hands of one or two elite exporters, and are now more centralized than at any time since the period 1976–1986.

### 3.3. The more things change, the more they stay the same

Following the announcement of the EU ban in 2007, the Government of Cameroon wrote to the EU in May 2007 undertaking to restrict the harvesting of *P. africana*, promising that: “rigorous





**Fig. 2.** Bark harvesters get paid a fraction of the FOB price paid to elite exporters, with the lowest prices paid to harvesters in remote sites. Around Mt Cameroon, where bark harvesters are most organized, there are just 48 active harvesters out of a population of over 100,000 people. All harvesters exploiting bark on Tchabal Mbabo are local people, as most are from NW Cameroon.

monitoring and strict control of harvests in situ, will continue” (Ngolle-Ngolle, 2007)<sup>1</sup>. While district and national bans are relatively easy to lift through the influence of political elites, the 2007 EU ban required a different strategy with international influence for it to be lifted. Inventory and monitoring activities also need to be funded if they are conducted and sustained. The tool needed by MINFOF to convince the EU’s Scientific Review Group (SRG) required needed international brand power and credibility. Instead of welcoming the 2007 EU ban as a positive policy change in the face of poor governance.

The following month, the Minister of Forestry and Wildlife requested that FAO lead a process to support the development of a Management Plan that ideally would result in the EU ban being lifted. The FAO then commissioned CIFOR to undertake the work. As Ingram (2014) describes, “this forced actors to work together to bricolage [sic] new governance arrangements, dictated by international conventions and based on revised formal regulations, customary best practices and projects. The resulting arrangements appear a framework for more sustainable livelihoods in the long term”. From an institutional perspective, “bricolage” was not good enough. There were many reservations about the poor quality of the report within CIFOR and it was recommended that the report should not be released. However, as a tool for advocacy and lobbying, the National Management Plan was ideal. Released through the FAO website under the CIFOR/FAO brand, it was submitted to the EU Scientific Review Group (SRG). The EU-SRG, unaware of concerns about the quality of the “bricolage” report, accepted it at face value and in 2010, agreed to lift the EU trade ban. Interviews with high-level decision-makers in Cameroon and Europe attest to the important role the Ingram et al. (2009) report had in influencing the EU-SRG to lift the trade ban (Cunningham et al., 2014).

The gaps between rhetoric and reality continue to be very apparent in advocacy with regard to *P. africana* and livelihoods, sustainable wild harvest and policies on “incentive based conservation” (Tables 1 and 2). In terms of supply chains, geographic distance helps the pharmaceutical companies look “clean and green”. In actual fact, Meuer (2008) points out, international pharmaceutical companies secure the majority of the benefits

while eluding both the responsibility and the costs of inventories, monitoring and management associated with managed long-term sustainable harvest. The release of advocacy video presentations produced with funding from European and North American pharmaceutical companies<sup>2</sup> (ITTO-CITES, 2009) and by the CGIAR’s Bioversity International<sup>3</sup> (Loo, 2011) contributes to the idealistic rhetoric about sustainable wild harvest<sup>4</sup>. Neither video production mentions the potential for cultivation as a long-term solution. Loo, (2011), for example, blames the 2007 EU ban for the fact that MOCAP harvesters have not been using their bark-processing machine, thus adding value locally. However, the reason that buyers will not purchase milled bark is because it is easily adulterated and obscures the identity of the source species (R. Nkuinkeu, Pers. Comm., 2014). Advocacy using the National Management Plan (Ingram et al., 2009) and lifting of the 2007 EU ban not only created a windfall for elite exporters, it has also placed pressure on MINFOF and ANAFOR to request the EU and CITES for larger quotas. The reason for this is that while *P. africana* exports were allowed from Cameroon, Uganda and the DRC, no quotas were awarded by CITES to Burundi, Madagascar, Kenya or Equatorial Guinea (CITES, 2012). This created a global shortage of *P. africana* bark, pushing up bark prices and increasing Cameroon’s global share of the *P. africana* market from an average of 38% between 1995 and 2004 to 72.6% (658.6 t) in 2012. In 2000, for example, Plantecam sold exported *P. africana* bark for 2000 CFA per kg (US\$3 per kg<sup>5</sup>). Lifting the EU ban was conditional on a reduced quota of 150 t for 2010, 280 t in 2011 and 658 t in 2012. In February 2014, National Forestry Development Agency (ANAFOR) requested that the SRG increase the annual quota to 1092 t. This would be worth US\$6.5 million at the current price of US\$6 per kg.

### 3.4. Back to the future: cultivating a green economy

There is general consensus between researchers, advocacy groups and farmers that cultivation is necessary to sustain future trade. Over 20 years ago, detailed recommendations were made for a shift from wild *P. africana* bark harvest to supplies from cultivated stocks (Cunningham and Mbenkum, 1993). Although many of those recommendations were followed by ICRAF (Tchoundjeu et al., 2002; Gyau et al., 2013), the Limbe Botanic Garden (Sunderland and Nkefor, 1997; Sunderland et al., 2002) and many other local organizations, gaps in understanding about cultivation remain (Table 3). The largest gap of all is the lack of a separate supply chain for cultivated *P. africana* bark. Declaring an EU ban with a traceable supply chain in place could have had a very different outcome. Local farmers are overwhelmingly in favor of selling their bark at a fair price and avoiding the taxes currently imposed on wild harvested bark. These taxes represent 57% of the farm gate price for cultivated bark (Fig. 4). With tagging of cultivated trees, the process of developing a separate supply chain for cultivated *P. africana* bark is currently underway and could supply future markets demands both equitably and sustainably.

Yet at the local livelihood level, far more people would benefit, with considerably less effort, from policy changes and market access that encouraged cultivation. In 2008, before CIFOR’s involvement in developing the National Management Plan started, it was recommended that research on *P. africana* focus on cultivation, not on wild harvest, on the basis of recommendations over the past 20 years that cultivation was the most practical way of sustaining supplies (Cunningham and Mbenkum, 1993;

<sup>1</sup> 0822/L/MINFOF/SG/DF/SDAFF/SN. Implementation of CITES Convention in the European Union – consultation on the importation of *Prunus africana* into the European Union. 2 May 2007.

<sup>2</sup> <http://www.youtube.com/watch?v=VyGUMPGYQ6o>

<sup>3</sup> <http://www.youtube.com/watch?v=LZLMc8eLgG8>

<sup>4</sup> But see the following for an alternative view: <http://www.youtube.com/watch?v=WmoSPOEFvMY>

<sup>5</sup> At the 2000 exchange rate of 650 FCFA=1US\$.

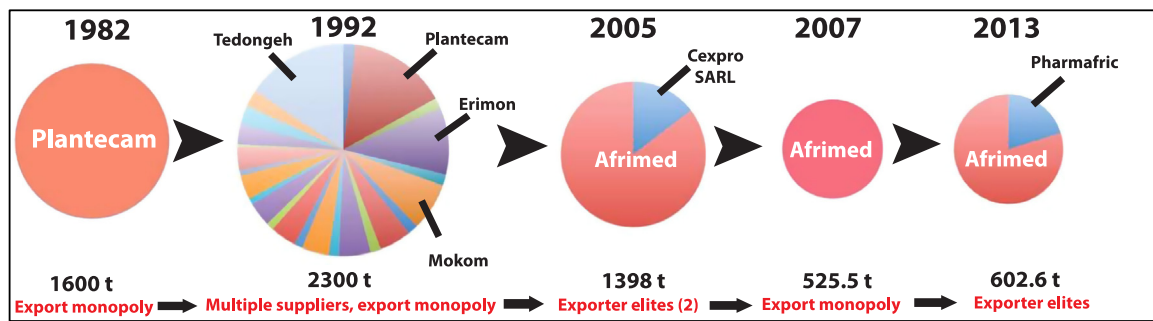


Fig. 3. The more things change, the more they stay the same: despite some diversification, a virtual monopoly over *P. africana* exports by exporter elites continues to be the case.

Table 2

Mutiny over the bounty: factual gaps in the rhetoric of lobbying and advocacy as a strategy to overturn the 2007 EU ban compared to the reality of the situation.

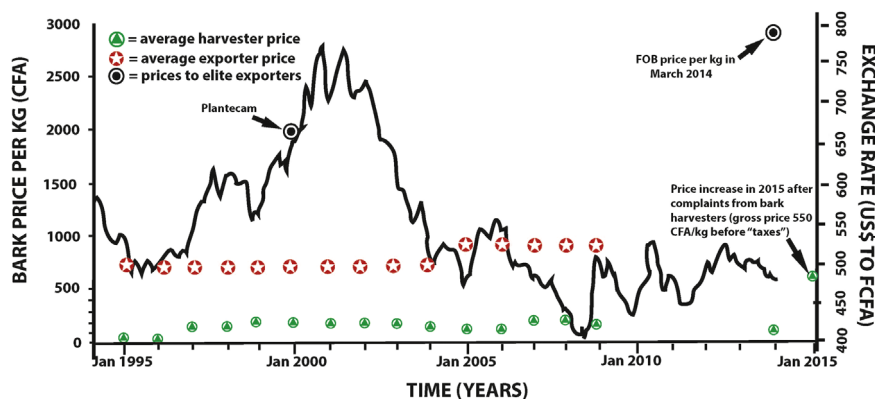
THEME	RHETORIC	REALITY
<b>Evidence of unsustainable harvest as a basis for the 2007 EU trade ban.</b>	"News of the destructive and large harvests in 2005 and 2006 reached conservation organizations, CITES and the EU, stoking fears, at the time unsubstantiated by evidence, of unsustainable trade" (Ingram, 2014)	For decades, research studies have provided evidence for destructive and unsustainable commercial harvest of <i>P. africana</i> , not only in Cameroon (Ewusi et al., 1992; Ewusi, 1996; Nkeng, 2009), but also in Equatorial Guinea (Sunderland and Tako, 1999) and Madagascar (Walter and Rakotonirina, 1995). Stewart's (2001) matrix population modeling study concluded that continued harvest of bark from large trees was totally unsustainable. This and other evidence was summarized in the CITES Significant Trade Review (Cunningham, 2005) tabled at the CITES meeting in Lima (2006).
<b>Impact of the 2007 EU Trade ban</b>	The EU ban was "a tragedy for livelihoods...abruptly ending exports and leading to a two-year period of uncertainty with little to no income for any actors in the chain" (Ingram, 2014)	46% of the actors in the <i>P. africana</i> supply chain considered the EU trade ban a fair decision, with a further 14% considering that the EU ban was predictable given the destructive exploitation of <i>P. africana</i> stocks (Anoncho, 2014). Only 5% of respondents said the EU decision was unfair. In NW Cameroon, which is more remote than Mt Cameroon area in the southwest, there is a high level of awareness of the 2007 EU ban, with 54% of actors aware during 2007 with an additional 38% becoming aware of the EU ban in the years after the ban was in place.
<b>Development and release of the National Management Plan (NMP) in order to have the EU ban lifted.</b>	The 2007 EU ban "forced actors to work together to bricolage new governance arrangements, dictated by international conventions and based on revised formal regulations, customary best practices and projects. The resulting arrangements appear a framework for more sustainable livelihoods in the long term" (Ingram, 2014)	It was recommended that the "bricolage" report should not be released as it cobbled together inventories based on different methods and recommended harvest quotas for forests such as Kilum-Ijum forest reserve where Stewart (2001) had clearly shown harvest was unsustainable. Rather than being a "framework for more sustainable livelihoods in the long term", the report was primarily used as a tool to convince the EU's SRG to lift the ban on <i>P. africana</i> bark imports into the EU.
<b>National Management Plan as a regional model</b>	The National Management Plan for <i>P. africana</i> in Cameroon is a "pragmatic management plan for the sustainable exploitation of <i>Prunus africana</i> in the short and long term. This plan is innovative for Cameroon. It is also relevant for all countries in Africa where <i>Prunus</i> potentially could be exploited".	<ul style="list-style-type: none"> <li>Although the management plans within Prunus Allocation Units (PAU's) are the basis of continued wild harvest, it was apparent from CIFOR research (Cerutti et al., 2008) published before the National Management Plan (Ingram et al., 2009) of the massive gap between goals of the 1994 Forestry Policy, which required detailed forest management plans (FMPs) from logging companies and the reality: 14 years after the legislation was in place, the government had not implementing "effective minimum sustainability safeguards and that, in 2006, 68% of the timber production was still carried out as though no improved management rules were in place". The same applies to <i>P. africana</i> today.</li> </ul>
<b>Harvest within National Parks as a policy outcome of the National Management Plan.</b>		As recommended over 20 years ago, commercial harvest should be phased out of Mt Cameroon National Park and forest reserves in favor of cultivation by local farmers (Cunningham and Mbenkum, 1993). While on-farm <i>P. africana</i> is building up, licensed seed and wildling harvesters should be allowed to collect seed and wildlings from MCNP to supply locally run nurseries around the national park.

Cunningham et al., 2002). Yet the National Management Plan subsequently produced focused almost exclusively on wild harvest, followed by the lifting of the EU ban after only three years. It is in the best interest of pharmaceutical companies whose customers are increasingly aware of Fair Trade and "green economies"

to help develop traceable supply chains for cultivated *P. africana* bark. This is sorely needed. From 2003 to 2011, the source of more than half (57%) of the *P. africana* bark exported from 2003 to 2011 was unknown as no official distinction was made between legal and illegally harvested bark (Ingram, 2014). The current

**Table 3**Green production and red herrings: a reality-check on *P. africana* cultivation showing the gap between rhetoric and what actually occurs.

Theme	Rhetoric	Reality
<b>Trade from cultivated <i>P. africana</i> stocks</b>	Significant quantities of bark in the export trade are from cultivation.	The majority of exported bark is from wild harvest. Although many farmers have planted <i>P. africana</i> since 1977 (Cunningham and Mbenkum, 1993) and cultivation is a viable economic proposition (Cunningham et al., 2002), relatively few farmers are harvesting bark for sale. Some are so discouraged by poor prices they are paid for bark that they are cutting down their trees for the timber uses (P. Tchouto, Pers. Comm., 2014). In West Cameroon, although more than 94% of farmers planting, at least 90% of <i>P. africana</i> bark still exploited from the forest (ICRAF/IRAD/University of Dschang, 2008). Approximately 70% had never been harvested (Ingram et al., 2014). The EU ban stimulated commercial farmers and pharmaceutical companies to consider partnerships for cultivation (Ingram, 2014). What is needed are separate supply chains for cultivated bark and farmers groups who cooperate in order to sell container loads of traceable high quality bark for fair prices.
<b>Use of the “regeneration tax”</b>	The regeneration tax funds <i>P. africana</i> cultivation.	Most informants are unclear what happens to this tax. It is collected specifically to fund reforestation efforts for <i>P. africana</i> , yet MINFOF themselves admit they do little or no work of this kind.
<b>Recognition of extensive <i>P. africana</i> cultivation by local farmers</b>	“These facts demonstrate the previously unrecognized large-scale of domestication” (Ingram, 2014).	The extent of <i>P. africana</i> cultivation by local farmers was recognized over 20 years ago (Cunningham and Mbenkum, 1993). A follow-up study showed that <i>P. africana</i> cultivation was an economically viable option and suggested that (Cunningham et al., 2003). However the production potential of planted stand still poorly documented.
<b>Conservation of <i>P. africana</i> genetic diversity</b>	Cultivated stocks of <i>P. africana</i> are “an important genetic source” (Ingram et al., 2009; Ingram, 2014).	For years, Plantecam supplied seed to farmers. However, seed collection has been primarily opportunistic and not based on a systematic attempt at genetic selection, thus the genetic value of much cultivated stock is unknown. A comparative analysis of genetic diversity among cultivated and natural stand in the north west region indicated no significant difference indicating that the current domestication strategy helps conserve the genetic diversity found in natural populations (Avana et al pers comm, 2014)
<b>Cultivated <i>P. africana</i> trees should be considered wild for permitting purposes.</b>	Cultivated trees are the first generation from wild collected seed or wildings, so should be considered wild and must come under MINFOF wild harvest permit system.	This may be a strategy to get additional taxes and retain control, rather than allow decentralized production and trade through separate, traceable supply chains. Separate supply chains have been implemented for farmed CITES listed species as diverse as orchids and crocodiles and are possible for <i>Aquilaria</i> resin (agarwood) as well (Espinoza et al. 2014).
<b>Debarking of cultivated trees and the “two quarters method”</b>	Farmers are so used to hearing about the “two quarters methods” that they want to apply this to trees on farm.	It is likely to be more economically viable to fell cultivated <i>P. africana</i> trees, to harvest 100% of bark, selling the timber and branch wood (for timber and fuel).



**Fig. 4.** Average prices paid per kg for *P. africana* bark to harvesters and “exporters” (Ingram, 2014) plotted against the US\$/FCFA exchange rate, also indicating prices paid to elite exporters, which despite the decline in the value of the FCFA to the US\$, have doubled from US\$3 per kg to US\$6 per kg between 2000 and 2014. Bark harvesters, with limited bargaining power over elite exporters and no information on prices paid by European importers, have to be “price takers”. Elite exporters in turn argue that as they pay costs for inventories and management plans (with the exception of Mt Cameroon), they need to pay a low price for bark.

PSMNR-SW<sup>6</sup> funded inventory of *P. africana* on farms is therefore very timely. As is the availability of new technologies that can

facilitate tracking, such as bar coding and smart-phones used to read bar-codes on sealed bags of cultivated bark.

#### 4. Discussion

Worldwide, there are numerous instances where neither

<sup>6</sup> Programme for the Sustainable Management of Natural Resources, South-West Region.

research nor monitoring have influenced policy decisions or positive actions on natural resource use or conservation. Linklater's (2003) global synthesis of rhino research, for example showed that all rhino species were declining while rhino research outputs had increased. *P. africana* is a similar case of the “knowing but not doing” gap. Habel et al. (2013), identified not one gap, but three gaps between conservation science and conservation action (1) the “knowing-doing gap” (2) a thematic gap between the topics addressed by conservation science and the problems faced in conservation; and (3) a disciplinary gap, with Habel et al. (2013) calling for inter-disciplinary research at multiple scales in the field of biodiversity and conservation science. In the *P. africana* case, bridging the “knowing-doing gap” requires transdisciplinary research (Max-Neef, 2005) that goes way beyond conservation science into political ecology and environmental economics.

When it comes to public attention, plants usually have a low profile compared to charismatic mammals such as pandas, rhinos and elephants. *P. africana*, the only African wild relative of peaches, plums and almonds, is an exception. In the 1990's *P. africana* trade was discussed in British parliament, with *P. africana* becoming a “flagship” species for DFID (Page, 2003). The World Agroforestry Centre (ICRAF) even suggested that just as the Giant panda was a symbol for protecting endangered animals, so *P. africana* was the icon for saving threatened trees (Page, 2003), despite the fact that hundreds of African plant species are traded nationally for medicinal purposes, many more threatened than *P. africana* (Cunningham, 1991, 1993; Williams, 2013). Nevertheless, the *P. africana* case holds important lessons for the elusive goal of sustainable wild harvest of bark from many lesser-known African medicinal trees such as *Elaeodendron transvaalense* (Celastraceae) and *Warburgia salutaris* and *W. stuhlmanii* (Canellaceae), that are traded regionally, but not internationally.

In 1994, when *P. africana* was proposed for listing on CITES Appendix II at CoP9, many factors related to “Non-detriment findings” (NDF) were known: (1) the scale of the commercial bark trade on stocks depleted by habitat loss and destructive harvest; (2) that *P. africana* populations across Africa and Madagascar were chemotypically (Martinelli et al., 1986) and genetically distinct (Barker et al., 1992; Vinceti et al., 2013); (3) that bark regeneration in drier sites was limited and crown die-back occurred; (4) that poor governance was a key factor behind over-harvest, including within high conservation priority areas and (5) that small-scale farmers in Cameroon were producing many *P. africana* stocks in agroforestry systems and it was important to phase out harvesting of wild stocks and shift to bark exports from cultivation (Cunningham and Mbenkum, 1993; Tchoundjeu et al., 2002). What wasn't fully appreciated then, but is known now, are five additional factors need to be taken into account in NDF. Firstly, climate change influences on *P. africana* populations (Mbatudde et al., 2012; Vinceti et al., 2013). The range of the species has been affected by past climate change and the modeled distribution of *P. africana* indicates that the species is likely to be negatively affected in future, with an expected decrease in distribution by 2050 (Vinceti et al., 2013). Secondly, although pioneering work had been undertaken on chemotypic (Martinelli et al., 1986) and genetic variation in *P. africana* (Barker et al., 1994), the extent of variation across different sites, the need for conserving this variation of *P. africana* populations remains. This genetic and chemotypic variation reflects ancient dispersal routes and evolution of *P. africana* in separate and vulnerable montane forest “islands” in Africa and Madagascar (Kadu et al., 2011, 2012a,b; Vinceti et al., 2013). Thirdly, that current destructive harvesting practices affect the reproductive future and genetic diversity of exploited populations (Farwig et al., 2008). Fourthly, matrix population modeling based on fieldwork in Cameroon showed that *P. africana* population growth rates are most sensitive to death or low survival rates of

the large trees producing the most seed and that exploitation of large *P. africana* trees is unsustainable and leads to population decline (Stewart, 2001). Fifthly, that due to the cyanogenic glycosides it contains, *P. africana* is a fundamentally important species in the diet of rare primates such as red colobus (Chapman and Chapman, 1999; Chapman et al., 2003) and black-and-white colobus monkeys (Fashing, 2004). Sixthly, two types of additional “collateral damage” accompanying *P. africana* harvest are not being taken into account. These are bush-meat hunting by some bark harvesters and very commonly in Mt Cameroon National Park, felling of “ladder trees” and the lianas that bind them together. All *P. africana* harvesters are men, often with hunting experience. In Mt Cameroon National Park, and possibly elsewhere, harvesters are encouraged to climb *P. africana* trees using makeshift ladder using local materials (small trees bound with lianas). A 1000 t quota represents an estimated 18,000 *P. africana* trees being debarked, as many “ladder trees” felled and at least two lianas per ladder (36,000 lianas). This may have no effect on species populations or the forest: but it does require attention. Finally, despite the firm recommendation that no *P. africana* harvesting should take place within the areas set aside for Afromontane forest conservation (Cunningham and Mbenkum, 1993), commercial *P. africana* bark harvest would be allowed to continue within Mt Cameroon National Park (Eben-Ebai, 2011) and elsewhere (Bellew, 2006).

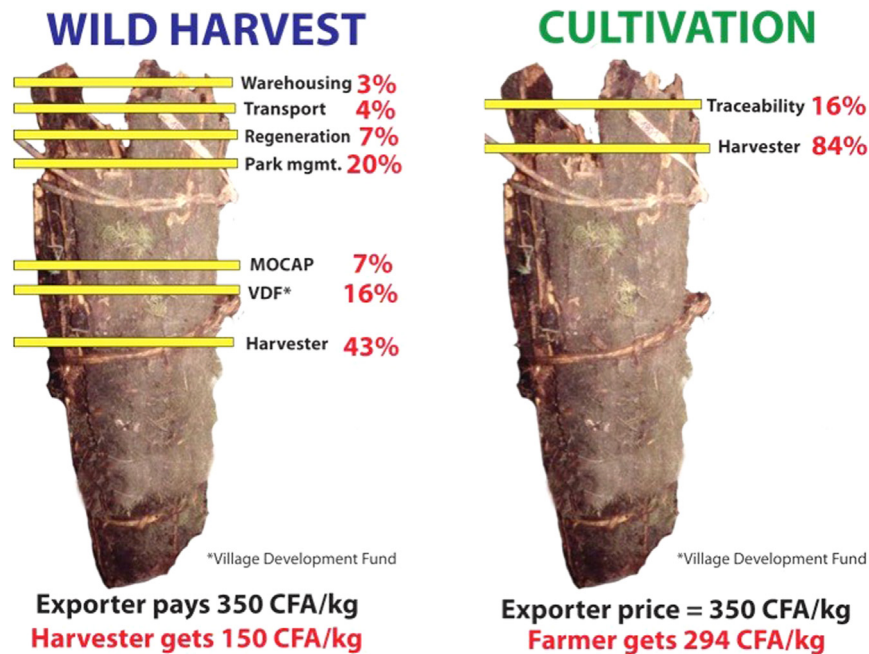
The decision made at the 42nd Meeting of the European Union Scientific Review Group (SRG) on the 7th of December 2007, where the EU decided to ban importation of *P. africana* bark stimulated an unprecedented level of lobbying and rhetoric in order to overturn the EU decision. Decisions based on advocacy rather research and action to develop separate supply chains for *P. africana* farmers has delayed a lasting solution for a sustainable *P. africana* trade. Globally, virtually all major sources of tree bark in commercial trade have made the transition from cultivation in agroforestry systems or plantations (wattle, cinnamon, cassia, quinine). Over twenty years ago, recommendations were made that *P. africana* follow the same path and that wild harvest within conservation areas should cease (Cunningham and Mbenkum, 1993), yet most research has focused on wild harvest. In many ways, the *P. africana* case is replete with ironies, contradictions and unintended consequences.

Why is there such a disconnect between policy makers and lobby groups and what is really happening in the forest? In Cameroon, there are many parallels between policy and practice of trade in timber and in *P. africana* bark. As Cerutti et al. (2008) points out for timber, Cameroon “needs more than approved management plans”. So does *P. africana*.

In Madagascar, powerful elites have subverted regulations on *P. africana* harvest and trade (Neimark, 2010). Médard's (1992) characterization of the ‘political entrepreneur’ who merges his roles as politician, government official, and businessman is particularly useful in the *P. africana* case. The export of forest resources (such as timber and medicinal barks from *P. africana* and *Pausinystalia yohimbe*) is an important source of revenue. So is development aid. Since Cameroon's independence, for example, Germany has provided €906.3 million to Cameroon. Following an agreement signed in December 2013, Germany will make an additional contribution of €94.5 million to Cameroon (2014–2016), specifically aimed at decentralized governance, sustainable use and rural development. The most influential stakeholders in the *P. africana* supply chain are government officials within MINFOR (including ANAFOR) and elite exporters (Ingram, 2014).

Lifting the ban on *P. africana* exports from Cameroon, while zero quotas were in place for competitor countries (such as Burundi, Kenya, DRC) created an ideal business opportunity for elite exporters. In theory, as with timber concessions in Cameroon,





**Fig. 5.** Bark production from cultivation will bring better profits with less effort as long as government officials allow cultivated *P. africana* to be recognized as cultivated and not “wild because they are first generation produced from wild collected wildings or seed”.

allocation of PAU's was supposed to occur after an advertised, open, competitive bidding process. In practice, even where local organizations are involved, they have to link up with exporter elites who through MINFOF, are granted exploitation permits after the exporters have paid ANAFOR staff to conduct inventories on their behalf. In 2012, although Pharmafric was granted a quota in the remote, “resource rich frontier” of the Adamoua plateau (which has five PAU's) we were told that harvested quantities within their allocated PAU were far lower than they expected. Despite Afrimed having a history of paying low prices and of unsustainable *P. africana* bark harvests (Meuer, 2008), Afrimed continues to be the dominant exporter. Afrimed is part of Afrigroup, a very well connected business consisting of four companies under the umbrella of a large Cameroonian bank. The irony of funds from the German development bank (KfW) subsidizing a profit making *P. africana* exporter linked to a Cameroonian bank seems to have been lost in earlier policy dialogue. Owned by a Cameroonian entrepreneur, the Afrigroup wields significant influence well beyond forest products, through Afribank (created in 1998, annual turnover US\$1.8 million), Afrimed (created in 1995) with facilities in Bafoussam and Douala where the bark is stored and macerated before export, Afrilec SARL (an electronic goods importer) and Afrifixchange (a foreign exchange business with capital of US\$201 million) (Anon, 2005). Although banking, importing electronic goods and dealing in foreign exchange can be profitable businesses, there is no doubt that at exporting *P. africana* at a large scale is profitable too. The current price paid by a German company for a 20 foot container load of *P. africana* bark (on basis FOB African origin or CIF European destination) is US\$6 (=€4,32) per kg on delivery in Hamburg with CITES documents (J Brinckmann, Pers. Comm., 2014). Cameroon's labor costs of chopping a tonne of bark are a small proportion of this gross revenue. The cost of shipping a 20-foot container to Hamburg is around US\$2000, giving a significant profit margin. Prices paid to bark harvesters have not reflected international exchange rates, but for elite exporters, bark has become a hedge against the declining value of the FCFA (Fig. 5). For example, the 2012 bark quota (658,675 t) would be worth over US\$3.9 million. It is no wonder, therefore, that a request was made through ANAFOR to the EU SRG in

February 2014 to increase the 2014 quota to 1092 t, as this would be worth US\$6.5 million.

We now know more than enough to bridge the “knowing but not doing gap”. Many of the problems of that Ingram et al. (2009) sought to resolve persist: unsustainable harvest, quotas greater than wild sustainable stocks and low income to wild bark harvesters. As do the contradictions between decentralization implicit in Cameroon's 1994 forestry law and highly centralized power over rights to harvest Special Forest products, including *P. africana*. But the ripple effect of assuming that Cameroon's wild harvest model (Ingram et al., 2009) can be applied elsewhere is serious. These include *P. africana* bark assessments have also being carried out in and around national parks in Burundi and in the Democratic Republic of Congo (Betti, 2012; ITTO-CITES, 2012). These conservation areas occur in Africa's most biodiverse ecoregion, with an extremely high number of threatened and endemic species. More than ever before, pragmatic policies need to be based on thorough research and on the ground reality checks.

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