ABSTRACT

Purpose: Women farmers have less access to extension services than male farmers, even though they make up almost half of the global agricultural workforce. Gender-focused international development programmes have focused on how ensuring women receive better access to advice. However, the quality of the technical advice and the service women receive in comparison to male farmers needs better understanding. Study design/methodology/approach: Five thousand interactions between male and female extension workers (‘plant doctors’) and farmers attending Plantwise plant clinics in Ghana and Sri Lanka are assessed for gender-based differences on quality of advice and service provided at clinics. Findings: The overall quality of technical advice given to male and female farmers at plant clinics in both countries did not differ. The quality of the advice given by male and female plant doctors for a specific pest/crop complex was different, and can be linked to results from the quality of service surveys that revealed women’s main negative feedback was the impracticality of advice. Practical implications: Whilst the advice given is technically sound, results highlight the importance of appropriate advice, according to farmer gender and crop grown. Theoretical implications: A greater focus on plant doctors using their knowledge about women’s role in agriculture would help to achieve more tailored advice. Originality/Value: This study leads the way in assessing the quality of the advice given according to gender. With large datasets, this research should help decision makers and future researchers to contemplate advice delivery according to gender.

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Introduction

Gender roles demonstrate accountabilities between men and women according to their economic activities, resource access and decision-making authority (World Bank 2012). They define what men and women do, and how much control and authority they have to accomplish their tasks effectively. Gender-specific roles are therefore a definition of

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their activities in society, and can be shaped by the culture and class surrounding them (Kingiri 2013). Within agriculture, women have traditionally worked on different processes within the value chain. For example, men are usually responsible for physical labour such as land clearing, whilst women weed and process post-harvest crops in sub-Saharan Africa (Guyer and Idowu 1991; Kasante et al. 2001), or plant and cultivate the crop in Asia (Quisumbing and McClafferty 2007). Also, it has long been stated that different crops are assigned to different genders (Quisumbing and McClafferty 2007), as men cultivate the cash crops and women subsistence/household crops. This has been disputed recently, as Doss et al. (2011) study of nationally representative household survey data from Ghana and other countries discovered boundaries between male and female crops may be less rigid that at first thought, particularly as household level economics become a more important measure of wealth than particular gender’s crop and labour outputs from the field (Peterman, Behrman, and Quisumbing 2011).

Women’s lack of access to extension advice, land, resources, agricultural inputs and lack of professional opportunities in agricultural extension due to national sociocultural defined roles and identities is considered to be one of the greatest restrictions for increased agricultural output and productivity (Beintema 2006; Mogues et al. 2009; Meinzen-Dick et al. 2011; Ragasa et al. 2013; Jafry and Sulaiman 2013; Manfre et al. 2013; Christie, Van Houweling, and Zseleczky 2015), even though they make up almost half of the agricultural workforce in some regions, particularly sub-Saharan Africa (FAO 2011). Whilst there has been a focus on women’s access to extension services – (a) how to improve their access; (b) which extension delivery methods work best; (c) how to ensure that women receive the advice they actually need and (d) how to ensure women extension workers are the ones giving the advice (Manfre et al. 2013) – understanding perceived quality of advice and service differences according to client/provider gender has rarely been the focus of research in the past.

A ‘good quality’ extension service is described as one with a high number of extension agents per farmer or a high number of visits or contacts between farmer and agent (Ragasa et al. 2013), useful, high-quality advice (Ragasa et al. 2013; Thuo et al. 2014). However, objective measurements of quality of extension services are very rare for various reasons, mainly due the paucity of data recorded during extension visits (World Bank Agricultural and Rural Development 2002). The quality of advice is hard to assess primarily because it is hard to measure what constitutes ‘good’ advice. Is it based on technical accuracy, affordability, available practices or uptake by farmers? The quality of the service should be measured in relation to other health services, such as animal and human health systems (Danielsen and Kelly 2010). Therefore, timeliness and communication/attitude feasibility of advice, organisation, location/venue/equipment/material and scale/outreach are all important factors (Danielsen et al. 2013).

Plantwise (www.plantwise.org) is a global programme that delivers extension advice to farmers on any problem affecting any crop. ‘Plant doctors’, generally government and non-government organisation extension workers, provide advice through a network of plant clinics throughout the country. These run at regular hours in accessible places for farmers to attend and ask questions about their plant’s health. The programme draws its concept from human and animal health care, where clinics provide the forum for an initial contact between patient and health-care worker.
In this paper, we propose to use data from the Plantwise programme in Ghana and Sri Lanka to consider whether the quality of the advice and service given to male and female farmers by male and female extension workers at plant clinics differs.

Plantwise is well established in both Ghana (since 2012) and Sri Lanka (since 2013). There are plant clinic networks and many trained plant doctors in both countries, as well as data management systems that ensure plant clinic data are entered into a centralised database, meaning there were sufficient data records to perform an analysis of both technical and service quality.

In Ghana, agriculture contributes to 36% of the country’s Gross Domestic Product (GDP) and employs 70% of its labour force (FAOSTAT). Cocoa alone made up 8.1% of its total GDP in 2005/2006 (Breisinger, Diao, and Kolavalli 2007). Women make up 52% of the agricultural labour force, contribute to 46% of the agricultural GDP, and 67% work in agriculture producing about 70% of food crops (World Bank 2012).

The cultural and social significance of gender roles in agriculture in Ghana has been well studied recently, with Doss et al. (2011) studies stating that gendered patterns of cropping are lacking in evidence, and indeed, change over time. Women’s high numbers of household chores – whilst handling other responsibilities such as firewood and water collection, as well as field work and mill grinding – further blurs the distinction of gendered cropping activities, and reinforces the importance of female- and male-headed household economics, particularly for cocoa (Doss et al. 2011).

Extension delivery is primarily a government responsibility in Ghana, though many other actors are involved including development partners and non-governmental organisations. There is a poor farmer access to extension staff: four to five million smallholder farmers for 3500 agricultural extension agents in Ghana (McNamara et al. 2014). The lack of access is compounded by extension’s lack of funds for transport, further reducing extension worker access to farmers. Women farmers are even further disadvantaged by the lack of agricultural students and resulting female extension workers in many districts (Beintema and Di Marcantonio 2009; World Bank and IFPRI 2010; McNamara et al. 2014; Christie, Van Houweling, and Zseleczky 2015), especially in areas where the cultural norms mean it is difficult for a female farmer to talk to a male extension worker. Furthermore, a World Bank study showed only 2% of female-headed households had access to extension advice, compared to six times this number for male-headed households, and many less women participate in farmer meetings than men (World Bank 2010).

In Sri Lanka, agriculture contributes 9.9% of GDP (World Bank 2014) with the main crops being paddy rice, coconut and sugarcane (FAOSTAT 2011).

Sri Lanka is a generally progressive state when it comes to gender inequality and roles, although the patriarchal nature and land ownership laws of Sri Lankan society ‘remains heavily segmented and offers limited sustainable economic opportunity for a majority of women’ (Withers and Biyanwila 2014). Women’s lack of access to new technologies has relegated women to agricultural support activities, rather than decision-making roles (Ratnayake 2015). What is more, new technologies, including weedicide, have further confined women’s role in agriculture (Ratnayake 2015). Fifty-six per cent of women work as unpaid family workers mainly participating in planting weeding and post-harvest work (van der Molan 2001), increasing in intensity and time as plantations grow. Policy packages need to be developed to focus on capacity development in multiple sectors (including agriculture) in order to reduce gender gaps resulting from traditional
sociocultural roles (Wickramasinghe 2009), and women should be involved in farmer organisations in order to participate in decision-making (Ratnayake 2015).

Extension delivery in Sri Lanka is primarily a government responsibility with some private delivery agents. The private extension tends to be crop specific and does not cover the range of crops that are grown. The government extension service has 872 field extension workers (P. T. Bandara, personal communication) who have to provide extension support to over two million farmers (Sri Lanka Labour Force Survey 2014). This gives an extension worker to farmer ratio of approximately 1:3000, similar to Ghana’s. Very little research has been conducted on the quality of the extension advice, or the service their clients are receiving.

**Research aims**

Within Plantwise, the focus on quality is twofold: the quality of the service at plant clinics and the quality of the advice provided by the plant doctors at plant clinics:

*Quality of technical advice delivered at plant clinics:* Does farmer gender affect the technical quality of the advice they receive from plant doctors? Do male and female farmers receive the same or different recommendation for the same problem? Is the quality of advice given by men and women plant doctors different?

*Quality of service delivered at plant clinics:* Do male and female plant doctors interact equally with both farmer genders? Were both genders equally satisfied with the service from the plant doctors? Do male and female farmers equally perceive the advice as useful and implement it?

**Methods**

*Assessment of quality of technical advice*

Plant clinic records capture crop, symptoms, diagnosis made and the advice data on every visit made to a clinic by a farmer and are entered into a central database. Clinic records from 1 January 2012 to 29 June 2015 were used for both countries. Records from both countries were divided equally between six members of a CABI validation team and validated over 10 days according to a protocol that verifies if the diagnosis is clear, if the problem occurs on this plant in the country, if the symptoms match the diagnosis and whether the advice given to the farmer corresponds to the best available advice currently recommended in each country, including locally adapted practices (Danielsen et al. 2013). Subjectivity of validation team was reduced by discussions between team members about particular cases, as well as reference materials, such as the official pesticide lists of each country, the Plantwise banned chemical list and extra country and pest-specific documents, being provided.

Subsequent analyses were carried out on the most frequent problem seen at plant clinics in Ghana: capsid and mirid attacks on cocoa in Ghana. Both insects *Distantiella theobroma* and *Sahlbergella singularis* were aggregated for this analysis as they are extremely hard to differentiate, cause very similar symptoms and resulting problems on cocoa, and are controlled by similar management practices. It was not possible to analyse a subset of Sri Lankan crop/pest complex due to the disparate nature of the pests and crops brought to the clinics.

Statistical significance testing was conducted through binomial Z tests. The equation’s null hypothesis states that there is no difference between two population proportions.
Assessment of quality of service

Plantwise also conducted a rapid phone survey of farmers, designed to assess satisfaction with the plant clinic services they had received. When farmers visit plant clinics, their phone numbers are recorded and included in the clinic record entered into the Plantwise database. Phone numbers were sorted into separate male and female farmer lists, using a farmer’s most recent visit for those who had made repeat visits. The records in each list were then assigned a number between 0 and 4, and sorted and contacted according to a randomised sampling strategy. Unanswered numbers were called up to three times.

A closed question format was designed, validated, adjusted and translated with 60 randomly selected farmers in Kenya beforehand. A minimum of 250 farmers were targeted per country, with equal numbers of men and women if possible. Data collection was carried out in June 2015. The number of farmers surveyed in Sri Lanka (280) and Ghana (142) provided sufficient data to analyse. Overall, 63% of farmers visiting plant clinics in Ghana had phones, although the figures I 31% for Sri Lanka farmers. Questions included whether they were satisfied with the service received and why; the knowledge of the extension worker or plant doctor and their understanding of the language used; their satisfaction with the advice and whether they applied it or not. Results from the surveys were cross-checked with clinic data to verify farmers’ responses.

Results

Summary data

Table 1 provides a breakdown of the numbers of male and female farmers seen by male and female farmers in Ghana and Sri Lanka. In Ghana, the proportion of male plant doctors and their interactions with female farmers, as well as the difference in the proportion of female farmer interactions with male or female plant doctors, is not significant. In Sri Lanka, there is no statistical correlation between the number of male plant doctors and their interactions with female farmers, but there is a strong statistical significance in the proportion of female farmer interactions with male or female plant doctors ($p = 0.05$).

Quality of advice overall

Overall, 3619 diagnoses out of 5123 were accepted when validated; of accepted diagnoses, 2905 recommendations (80%) were accepted, whilst 609 (17%) were rejected for being ineffective, or unsafe (Table 2).

<table>
<thead>
<tr>
<th></th>
<th>Male plant doctors</th>
<th>Female plant doctors</th>
<th>Total no. of queries</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of male farmers</td>
<td>No. of female farmers</td>
<td>No. of male farmers</td>
<td>No. of female farmers</td>
</tr>
<tr>
<td>Ghana</td>
<td>53</td>
<td>2121</td>
<td>5</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>106</td>
<td>752</td>
<td>95</td>
</tr>
</tbody>
</table>
Ghana

Eighty-eight per cent of recommendations for Ghanaian women farmers are accepted whereas the figure is 81% for Ghanaian men farmers. This result is significant ($p < .05$). Traditional knowledge recommendations were negligible in both cases.

Sri Lanka

In Sri Lanka, 76% of recommendations given to male farmers were accepted; the figure was 68% for women farmer recommendations. This difference is significant ($p < .05$). Six per cent of male farmers and 8% of female farmers in Sri Lanka received recommendations based on traditional methods, a much higher proportion than in Ghana.

Comparison

There is a significant difference between accepted recommendations for Ghanaian and Sri Lankan men farmers, and also for Ghanaian and Sri Lankan women farmers (men: $p = .003 < .05$; women $p = .05$).

Quality of advice for capsid/mirid on cocoa in Ghana

Overall, 212 of the 220 (96%) accepted diagnoses had an effective and safe recommendation given by plant doctors (Table 3). Male plant doctors achieved a 98% rate of accepted recommendations, whilst women plant doctors achieved 92%, a significant difference ($p = .022 < .05$). Male and female farmers both received high-quality advice for their respective queries (men: 96.5%; women: 94.5%; $p = .41 > .05$ – not significant). Male farmer queries were given better advice by male plant doctors (100% accepted) than by female plant doctors (90% accepted) ($p = .001 < .05$ – significant). Female farmers received equally good advice by male and female plant doctors although the

| Table 2. Accepted, rejected and local knowledge recommendations by gender. |
|-----------------------------|-----------------------------|
| Recommendations                     | Overall                      |
|                                  | Ghana                        | Sri Lanka          |
|                                  | Male farmers | % | Female farmers | Male farmers | % | Female farmers | Male farmers | % | Female farmers | Male farmers | % | Female farmers | Male farmers | % | Female farmers | Male farmers | % | Female farmers | Male farmers | % | Female farmers | Male farmers | % |
| Accept                          | 2143 | 80 | 762 | 81 | 1543 | 81 | 545 | 88 | 600 | 76 | 217 | 68 |
| Local knowledge                | 74  | 3  | 31  | 3  | 23  | 1  | 6  | 1  | 51  | 6  | 25  | 8  |
| Reject                         | 466 | 17 | 143 | 15 | 331 | 17 | 68 | 11 | 135 | 17 | 75  | 24 |
| Totals                         | 2683| 100| 936 | 100| 1897| 100| 619 | 100| 786 | 100| 317 | 100|

| Table 3. Accepted and rejected recommendations by plant doctor and farmer gender. |
|---------------------------------|-----------------|
| Recommendation                  | Accept | Reject |
| Category of validation          | N      | N %    | N %   |
| Overall                         | 220    | 212    | 96    | 8    | 4    |
| Male farmer                     | 140    | 136    | 96.5  | 4    | 3.5  |
| Female farmer                   | 80     | 76     | 94.5  | 4    | 5.5  |
| Male plant doctor               | 160    | 157    | 98    | 3    | 2    |
| Female plant doctor             | 60     | 55     | 92    | 5    | 8    |
| Male plant doctor to male farmer| 100    | 100    | 100   | 0    |      |
| Male plant doctor to female farmer| 60    | 57     | 95    | 3    | 5    |
| Female plant doctor to male farmer| 40    | 36     | 90    | 4    | 10   |
| Female plant doctor to female farmer| 20    | 19     | 95    | 1    | 5    |

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small number of female farmers to female plant doctor interactions reduces the power of
the analysis.

Out of the 212 accepted recommendations, 58% provided all treatment options (a comprehensive recommendation), whilst only 29% had sufficient information to implement the recommendations (a detailed recommendation) (Table 4). Male farmers receive a higher number of best practices than female farmers, although female farmers receive more details about particular practices than their male counterparts. Conversely, male plant doctors recommend a smaller number of best practices than female plant doctors, but give greater detail for each practice they recommend. Male plant doctors provide the lowest number of different recommendations to female farmers. Female plant doctors provide both the highest rate of comprehensive (63%) and detailed (37%) recommendations to female farmers. They also provide the lowest amount of details in the recommendation when giving the advice to male farmers. All relationships in this paragraph are statistically insignificant.

Thirty-nine plant doctors gave a chemical solution only, compared to 23 non-chemical solutions only, a significant difference ($p = .03 < .05$). Overall, more chemical recommendations were given both to male and female farmers for the control of the pest than non-chemical measures (218–207) by male and female plant doctors (Table 5). A gender analysis shows female farmers receive more chemical recommendations from both plant doctor genders than male farmers do (all results above are statistically not significant). Male plant doctors recommended proportionally more chemical solutions than female plant doctors; although the small number of female plant doctors giving recommendations (10 compared to 60 male plant doctors) reduces the weight that can be placed on these results. Male plant doctors give significantly more non-chemical control measures than female plant doctors ($p = .02 < .05$).

**Table 4. Quality of recommendations by plant doctor and farmer gender.**

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Comprehensive</th>
<th>Detailed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category of validation</td>
<td>$N$</td>
<td>$N$</td>
</tr>
<tr>
<td>Overall</td>
<td>212</td>
<td>123</td>
</tr>
<tr>
<td>Male farmer</td>
<td>136</td>
<td>82</td>
</tr>
<tr>
<td>Female farmer</td>
<td>76</td>
<td>41</td>
</tr>
<tr>
<td>Male plant doctor</td>
<td>157</td>
<td>89</td>
</tr>
<tr>
<td>Female plant doctor</td>
<td>55</td>
<td>34</td>
</tr>
<tr>
<td>Male plant doctor to male farmer</td>
<td>100</td>
<td>60</td>
</tr>
<tr>
<td>Male plant doctor to female farmer</td>
<td>57</td>
<td>29</td>
</tr>
<tr>
<td>Female plant doctor to male farmer</td>
<td>36</td>
<td>22</td>
</tr>
<tr>
<td>Female plant doctor to female farmer</td>
<td>19</td>
<td>12</td>
</tr>
</tbody>
</table>

**Table 5. Type of recommendations by plant doctor and farmer gender.**

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>chemical</th>
<th>Non-chemical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category</td>
<td>$N$</td>
<td>$N$</td>
</tr>
<tr>
<td>Overall</td>
<td>256</td>
<td>218</td>
</tr>
<tr>
<td>Male farmers</td>
<td>171</td>
<td>142</td>
</tr>
<tr>
<td>Female farmers</td>
<td>85</td>
<td>76</td>
</tr>
<tr>
<td>Male plant doctors</td>
<td>181</td>
<td>157</td>
</tr>
<tr>
<td>Female plant doctors</td>
<td>75</td>
<td>61</td>
</tr>
<tr>
<td>Male plant doctor to male farmer</td>
<td>116</td>
<td>98</td>
</tr>
<tr>
<td>Male plant doctor to female farmer</td>
<td>65</td>
<td>59</td>
</tr>
<tr>
<td>Female plant doctor to male farmer</td>
<td>55</td>
<td>44</td>
</tr>
<tr>
<td>Female plant doctor to female farmer</td>
<td>20</td>
<td>17</td>
</tr>
</tbody>
</table>
Quality of service

Farmers were asked whether they were satisfied with the service provided at the plant clinics. All female and male farmers in Ghana stated that they were satisfied. The percentages were slightly lower in Sri Lanka where 91% of women farmers and 95% of male farmers were satisfied with the service received.

When asked why they would revisit a plant clinic 67% of female and 69% of male farmers in Ghana stated it was because they had received good advice previously. However, the number of farmers who agreed with that statement in Sri Lanka was considerably lower at 40% and 42% for female and male farmers (Figure 1). Less than 90% of farmers in Sri Lanka were satisfied with the advice (Table 6). When asked why, most women farmers stated that the advice was not practical (Figure 2). Nine male farmers gave other reasons including there was no effect on crop yield, and that the fertiliser was not sufficient for the crop.

Whether farmers were satisfied with the advice provided also relates to whether they applied the advice. It could be implied that not all farmers applied the advice (Figure 2) but farmers were also asked specifically about this. One hundred per cent of female farmers and 97% of male farmers in Ghana did apply the advice while the numbers were lower in Sri Lanka at 71% and 82% for female and male farmers, respectively. In Sri Lanka, women farmers found the advice too costly and thought there were either better ways to solve the problem, or the advice did not answer their problem (Figure 3). Male farmers gave other reasons including the advice being given after the cropping season was over (Figure 4).

Table 6. Satisfaction levels with plant clinic services.

<table>
<thead>
<tr>
<th>Farmer answers on satisfaction</th>
<th>Ghana (n = 142)</th>
<th>Sri Lanka (n = 280)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female (%)</td>
<td>Male (%)</td>
</tr>
<tr>
<td>Farmer would attend plant clinic again</td>
<td>100</td>
<td>98</td>
</tr>
<tr>
<td>Farmer considered that the plant doctor was knowledgeable</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Farmer understood the terms and language used by the plant doctor</td>
<td>100</td>
<td>97</td>
</tr>
<tr>
<td>Farmer was satisfied with advice</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Figure 1. Reasons farmers would revisit plant clinics.
Figure 2. Reasons Sri Lankan farmers were not satisfied with the advice.

Figure 3. Reasons Sri Lankan farmers did not apply the advice.
Discussion

Quality of advice

Do male and female farmers receive the same quality of advice in Ghana? The quality of the advice for Ghanaian women farmers was significantly higher than for men, contrary to past research that public extension services are generally geared towards giving advice to male farmers (Swanson, Farmer, and Bahal 1990; World Bank and IFPRI 2010; Ragasa et al. 2013; Christie, Van Houweling, and Zseleczky 2015). However, the situation in Ghana is different: cocoa in Ghana is a complex household level issue that is not exclusively distinguished between genders when it comes to ownership and control (Doss et al. 2011). In theory therefore, there should be no difference in the quality of the advice. In this instance however the smaller female farmers sample size in Ghana could distort the results of the statistical tests in their favour.

Do male and female farmers receive the same or different advice for the same problem in Ghana? Both male and female farmers received high-quality advice for capsid/mirid damage on cocoa, with insignificant statistical differences. In this instance, Doss’s theory on the triviality of the importance of a gender-based crop is borne out.

However, when the study chooses to investigate in more detail the types of recommendations given, gender sensitive cropping roles can be highlighted: male farmers received a higher number of different options at clinics, for two reasons: for one, plant doctors realise that male farmers have traditionally more access to various technologies, such as seeds, fertilisers, pesticides and credit resources (Meinzen-Dick et al. 2011; Ragasa et al. 2012; Manfre et al. 2013). Secondly, female farmers are able to do less of the many agricultural activities in a cocoa field, and rely on hired labour to do so (Doss et al. 2011). Interestingly, however, the study showed that female farmers receive more chemical solutions than male farmers, but also obtain more details on how to apply it. This result could be influenced once again by the small female farmer sample size, but could also vindicate the plant doctors’ choices of advice to give to different genders.

Overall, this presents an interesting if confusing picture of gendered advice to farmers, and merits further research from a larger sample size in the future, studying farmers’ needs...
and realities in the field and relating them to sociocultural gender norms and roles in agriculture in Ghana.

Is the advice given from men and women plant doctors different for the same problem? In Ghana, male plant doctors give significantly better advice to farmers than female plant doctors, although both were of extremely high standards (98% compared to 92%), and could be influenced by the small sample size of the female plant doctor staff body.

Both plant doctor genders give proportionally more chemical recommendations than non-chemical ones. Indeed, 85% of all recommendations contain a chemical solution, and a significantly higher proportion of recommendations contain a chemical solution only. The chemical dependency of public extension services is not surprising, considering the historical use of pesticides (Kolavalli and Vigneri 2011), and the important economic nature of cocoa in Ghana. Public services such as CocoBod (www.cocobod.goh) and the E-agriculture internet platform (http://www.e-agriculture.gov.gh) have long focused on training extension workers to eradicate cocoa’s main pests and diseases, mainly by using extra inputs. Public extension workers were even deployed to offer advice as well as establish and supervise the distribution and usage of specific chemical inputs (fungicides and insecticides) to deal quickly and resolutely with problems since 2001 (Oppong 2015).

From a gender perspective, both plant doctor genders recommended more chemical than non-chemical solutions, although male plant doctors give significantly more non-chemical control measures to farmers than female plant doctors.

One must remember however that validation results are only as objective as the validation team’s perceptions of the advice written by the plant doctor. Prescription forms only record information written by the extension worker present at the clinic, and these plant doctors are often under pressure due to queues of waiting farmers (P.T. Bandara, personal communication). As a result, plant doctor records are not always complete. Any further study on the quality of advice should consider fully recorded interviews.

Also, the development stage of the cocoa tree and the severity of the problem, which definitely influence the types of recommendations given to solve the problem (Christie, Van Houweling, and Zseleczky 2015) was not linked to this study. Any further study should contain these variables if it does not render the analysis too complex.

Quality of service

Is there a gender difference in the farmers that male or female plant doctors see at their clinics? The results from both countries show that there is no correlation between the proportion of male/female plant doctors and queries brought in by male and female farmers. This supports the premise that farmers are seen on a first come, first serve basis in plant clinics, regardless of the plant doctor or farmer gender.

However, what if the farmer has a choice of male or female plant doctor? If the clinic was staffed by both female and male plant doctors, would female farmers prefer to see female plant doctors? In Sri Lanka where there are almost even numbers of female and male plant doctors, providing more choice to farmers, significantly more female farmers bring their crops to female plant doctors. This could raise the possibility that female farmers are more likely to choose same-sex extension workers when faced with a choice of genders for advice in certain cultures (Due, Magayane, and Temu 1997;
Manfre et al. (2013), a fact that the Swiss Agency for Development and Cooperation greatly encouraged in the mid-1990s (SDC 1995), although this can reinforce stereotypes rather than break down boundaries (Manfre et al. 2013). Due and colleagues do however go on to state that: ‘Farmers often stated that what was important was an extension agent who would assist them and not the gender of the agent’.

Were both genders equally satisfied with the service from the plant doctors? The lack of studies on quality of service provided by extension providers mean’s measures of satisfaction have to be based on more general satisfaction requirements. A number of factors form the basis for customer satisfaction with public services including information provision, professionalism and staff attitudes, as well as timeliness and delivery (Ipsos MORI 2010). In both countries, when asked directly about the service provided by plant doctors, female and male farmers stated high levels of satisfaction particularly regarding technical knowledge and their attitudes. What is more, in both countries, over 90% of female and male farmers would visit a clinic again, providing initial indications that they were both equally satisfied with the service provided.

Do male and female farmers equally perceive the advice as useful and implement it? A farmer’s understanding of the advice received is essential to the provision of quality advice. In addition, the advice has to be useful enough to the farmer for them to put it into practice (Ragasa et al. 2013; Thuo et al. 2014; Christie, Van Houweling, and Zseleczky 2015). In both countries, the majority of farmers stated that they were satisfied with the advice provided and put the advice into use, indicating that they considered it to be ‘quality’ advice. In Sri Lanka, 17% of female farmers, and 11% of male farmers did not use the advice given an insignificant difference, agreeing with initial findings that the uptake of technologies is not gender dependant, but depends on access to resources instead (Doss and Morris 2001). However, as we investigate further, women claimed the advice was not practical or too expensive to put into practice, whilst men who did not use the advice because the cropping season was over, and added they would use the advice the following season. This still qualifies as good quality advice for men. The impractical or uneconomic advice to women farmers would require a drastic situational change in order to practice the advice, so this advice can be labelled bad quality advice. It is important to point out that verifying the responses with clinic data showed that farmers in Sri Lanka were much more accurate recounting their clinic experience compared to Ghanaian farmers. This does cast some doubts as to the overwhelmingly positive feedback received in the telephone surveys, particularly for Ghana. As the questionnaire was conducted by Plantwise, who are also run plant clinics, it is possible that positive results were given to the enumerators as the respondents feared that negative results would result in a withdrawal of service. Even though the results for Sri Lanka were lower, they may be a truer reflection of farmers’ opinions of the advice they received. Therefore making use of the Sri Lanka results may provide a more accurate picture of whether the farmers thought they had received good quality advice. It is also important to consider the inherent bias of the study, choosing phone-owning farmers, and eliminating farmers who do not have a phone from the study.

Conclusions

Encouragingly, the approach taken by the programme results in no differences in the advice provided to male and female farmers from male and female plant doctors in
both countries. There are no significant differences in the advice delivered to male and female farmers for a popular crop/pest complex. For this problem, all farmers were given the best technical advice available, with male farmers receiving a wider variety of options, while female farmers were given chemical options more often, and with greater detail. Quality of advice was slightly higher in Ghana than in Sri Lanka, where more plant doctors have been operating for longer: this highlights the need for a clear cut training of trainers for continual refresher courses to be given to plant doctors to ensure they stay up-to-date with current practices and fully write their recommendations on the prescription sheets.

The quality of service surveys shows that a majority of both female and male farmers were satisfied with the service they received at a plant clinic, and applied the advice received. However, the lower satisfaction levels from female Sri Lankan farmers regarding the economic and practicality of the advice received is important to consider. Indeed, all the options to control a pest should be given to both female and male farmers so that they are able to choose the most appropriate control option for their own, money and time constrained, situation. In addition, plant doctors should be made aware of the implications of the advice for female and male farmers, so that the programme can offer appropriate good quality advice in a gender sensitive manner.

The programme must consider the women to women contact as essential for ensuring that vulnerable or disenfranchised groups have better access to plant clinics. More research needs to be conducted from a farmer and plant doctor’s perspective to consider the impact and quality of advice received/given, and how it relates to current sociocultural norms of the local area that prevents mixed-sex contact, or access to resources such as agricultural inputs, or lack of decision-making roles. A greater focus on studies reviewing plant doctors’ knowledge and advice to different genders, and effects on women’s roles in agriculture and learning about the apparent inequalities would help to achieve this tailored advice.

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