Title

The impact of Export Processing Zones [1] on Employment, Wages and Labour Conditions in Developing Countries

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[1] In this review we will use the term EPZ to refer to any zone created with special incentives in order to attract investments oriented mainly for exporting. This includes special economic zones, free trade zones and up to 30 different names

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1. Background

One of the most common instruments of industrial policy in developed and developing countries are Export Processing Zones. The ILO defines an EPZ as "industrial zones with special incentives set up to attract foreign investors, in which imported materials undergo some degree of processing before being exported again" [2] Different countries use different terms to name these specific zones. Singa Boyengue (2007) identifies more than 30 names for zones where there are government incentives to export; the most common names, in addition, to EPZs being free zones, industrial zones, special economic zones or free trade zones. In this review we will use the term EPZ to refer to any zone created with special incentives in order to attract investments oriented mainly for exporting.

EPZs largely proliferated after the Second World War, and have evolved in different ways according to each country policies. This expansion of EPZs was largely driven by the introduction of export lead growth strategies. In some countries, EPZs can include entire provinces, like in China, while in others, EPZs include single firms. The type of activity within the zone has also evolved, with some countries moving from labour intensive to technology intensive sectors, or even including services sectors such as tourism.

While the objective of EPZs is mainly to expand and develop export sectors in the country, the impact and rationale of EPZs have been heavily scrutinised by academics and civil society. This is due to costs associated to the range of incentives available in these zones and the problems that these might create. Some questions have been also raised regarding the compatibility of these measures with WTO and free Trade Agreements rules. But chief among concerns raised mainly by NGOs and trade unions, is the impact that EPZs have on labour market outcomes such as employment, wages, gender work and labour conditions.

1.1 Description of the condition

Many developing countries and some regions in developed countries experience low investment in manufacturing sectors, especially in those with more value added, dependency on a narrow export base and very high unemployment. EPZs are an attempt to address these

[2] ILO: Labour and social issues relating to export processing zones (Geneva, 1998), TMEPZ/1998, pp. 3.

issues, aiming at achieving higher manufacturing exports, industrial sector upgrading and employment creation, especially in specific labour intensive sectors.

1.2 Description of the intervention

As suggested above there are different types of zones, some include entire provinces and others single firms. More importantly different zones have different types of incentives, which make difficult the comparison of results across countries.

In general we can summarise the main set of incentives as:

- Tax exemptions on
    - Export taxes
    - Import taxes on inputs
    - Profit and property taxes, and other direct taxes
    - VAT
- Exemptions from foreign exchange controls
- No controls on profit repatriation
- Specific streamlined government services – i.e. custom services, business registration, etc.
- Provision of enhanced specific infrastructure for production, logistics and transport – i.e. better roads, free or subsidized lease of land or industrial plants, etc.
- Subsidized prices in public utilities such as electricity or water
- In some cases, derogation of specific sections of labour laws such as working hours or minimum wages.

Each zone implements some of the measures with different intensity, depending on the existing domestic market conditions, ability to attract FDI and the type of sectors aimed to be attracted to the zone. The size of the incentive and subsidy also depends on the general conditions of the economy. For example, in countries where the business environment is difficult, and where firms find it difficult to operate due to costly administrative and bureaucratic procedures, the size of these incentives is likely to be large. In addition, depending on the sector composition of the EPZ, different incentives play a more important role than others in attracting particular investments. In EPZs concentrated in labour intensive sectors such as clothing, derogations to minimum wages or limits to the number of hours worked may play an important role in attracting FDI. In other sectors, such as electronics, minimum wage derogations may not have larger impacts since they tend to pay higher wages.

1.3 How the intervention might work

a) The theory

EPZs by definition are not first-best interventions, since they do not address directly some of the problems that may constrain manufacturing growth. The incentives related to these interventions introduce distortions in order to attract investments in specific sectors that *a priori* would not be attracted to the country in the absence of these incentives. This can be the result of information asymmetries for investors or as a way of creating enclaves with good business environment in countries where governments face difficulties to eradicate investment barriers. In addition, governments use EPZs as an instrument to attract investment in sectors with no clearly defined comparative advantage or as a way of increasing value added in existing export activities.

As a result of the distortionary nature of the intervention, most theoretical analyses on EPZs have focused on the welfare impact of these interventions. The baseline model is provided by Hamada (1970) using a 2 sectors and 2 factors Heckscher-Olin model. The author shows that if investment flows to the EPZs are oriented towards producing a capital intensive good which is protected by a tariff in the domestic economy, then labour will flow from labour intensive activities in the domestic economy to the EPZ, amplifying the distortion imposed by the tariff in attracting resources to the protected sector. Two critical assumptions of the model are the fact that the labour intensive product is not produced in the EPZ and that there is full employment. When these two assumptions are relaxed the EPZ is not welfare decreasing ((Hamilton and Svensson, 1982), (Young and Miyagiwa, 1987)).

Some of the limitations of these theoretical frameworks are the lack of dynamic gains that are often invoked by policy makers. Issues related to backward linkages, firms learning, export diversification, spillover effects or technology transfer might be an important source of benefits for the country and may justify the distortions created by the EPZs.

While evaluating the impact of EPZs requires considering all these factors, this review focuses on a very specific set of labour market outcomes. Regarding labour markets, Young and Miyagiwa (1987) show that in the presence of Harris-Todaro type of unemployment due to wage rigidities in urban areas, the reductions in the tariffs for intermediates in EPZs decreases the impact of the tariff and wage

rigidity distortion. This increases wage in non-unionised sectors, reducing the gap with unionised wages and decreasing unemployment. Gupta (1993), however, using a similar model suggests that an expansion of the EPZ with a reduction on the tariff on intermediate inputs will result in lower national income and employment. On the other hand, if there is a reduction of the final good tariff, employment and income will grow. Finally, Din (1993) shows that under certain assumptions, the key element that will determine a beneficial impact of investment on the EPZ on employment is whether the "enclave" sector is capital intensive in relation to the domestic manufacturing sector. This is due to the fact that expansion in the capital intensive good will create fewer jobs than the displacement of labour in the domestic sector, therefore, increasing unemployment. On the other hand, the opposite result occurs if the "enclave" sector is labour intensive.

The results from these models point out at a few important elements when evaluating the impact of EPZs on labour market outcomes. Concretely, the level of tariff distortions in the economy, the factor intensity of the sector in the EPZ in relation to domestic sectors and the functioning of domestic labour markets.

It is important to highlight that these theoretical models focus mainly on the effect driven by tariff reductions within the EPZ. One set of incentives, however, that is crucial for the impact on the labour market, as we will see below, are derogations of some labour laws. The theoretical impact of these incentives has not been addressed, and may play an important role regarding labour conditions.

A final important element regarding labour market outcomes of EPZs that has not been addressed by the theoretical literature is the impact on the feminisation of labour within the zone. The sector composition of EPZs and some of the derogations of labour law may have a differentiated impact on gender (i.e. larger female employment, increase in the gender pay gap and worse labour market conditions for women within the zone).

b) Some evidence and the logic model

Table 1 below from Singa Boyenge (2007) describes the evolution of EPZs since the 1970. The table clearly shows the large increase in the number of countries implementing a EPZ, moving from 25 to 130 countries in 2006. The table also shows the raise in employment

generated in the EPZ and how 61% of this employment in 2006 corresponds to the large zones existing in China.

Table 1 Evolution of EPZs

	1975	1986	1997	2002	2006
Number of countries with EPZs	25	47	93	116	130
Number of EPZs or similar types of zones	79	176	845	3 000	3 500
Employment (millions)			22.5	43	66
China (millions)			18	30	40
other countries (millions)	0.8	1.9	4.5	13	26

Source: Singa Boyenge (2007)

Looking at the distribution of EPZs around developing countries and emerging markets, Table 2 shows that most zones are located in Asia and Latin America, and only 4% in Sub-Saharan Africa. According to FIAS (2008) [3] this accounts for around 7%-8% of world trade and around 20% of these countries exports. Although these results are largely driven by China, they show that the contribution of EPZs is likely to be larger on expanding exports than on creating employment.

Table 2 Distribution of EPZs by region in 2005

	Number of Zones	% share
Europe and Central Asia	365	15%
Middle East and North Africa	240	10%
Sub-Saharan Africa	114	4%
East and South Asia	1034	41%
Latin America	741	30%

Source: FIAS (2008)

Table 3 gives a more detailed picture of employment on the EPZs by region as estimated by the ILO. The estimated total amount of people employed in EPZs is around 63 million, three million less than what is estimated in Singa Boyenge (2007). As seen above, more than 60% of this employment corresponds to EPZs in China, while only 0.07% is employment created in Europe. Clearly the importance of EPZs for employment is primarily in developing countries, especially Asia. This is likely to be explained by the number and size of EPZs in these

[3] Foreign Investment Advisory Service (FIAS). 2008. Special Economic Zones. Performance, Lessons Learned, and Implications for Zone Development. Washington, DC: World Bank.

countries, and also by the more labour intensive sector composition of these EPZs in these countries.

Table 3 Distribution of employment and EPZs by region

	Employment	**Number of zones**
Asia	53,089,262	900+
China	40,000,000	
Bangladesh	3,250,000	
Central America & Mexico	4,988,459	155
Middle East	1,070,275	50
North Africa	643,152	65
Sub-Saharan Africa	816,474	90+
United States	330,000	713
South America	456,175	43
Transition Economies	1,131,462	400
Caribbean	542,163	250
Indian Ocean	189,412	1
Europe	45,472	50
Pacific	145,930	14
Estimated Total	63,118,236	2,700+

http://www.ilo.org/public/english/dialogue/sector/themes/epz/stats.htm
Source: ILO (2011)

While the increase in the number of EPZs and employment within them is clear, that is no evidence of a positive effect of EPZs. As suggested above, the assumption is that investment in the EPZ and employment are additional, and that the costs of intervention are not very large.

More importantly, some case studies report problems regarding labour standards and labour conditions. Milberg and Amengual (2008) survey the literature on EPZs and find that in some zones there are derogations from parts of the labour laws (i.e. Togo derogation on hiring laws). Also, in other countries where labour laws are maintained there is some evidence of problems to enforce law. The authors report problems in terms of Unionisation in Bangladesh, where it is suggested that this is effectively discouraged within the EPZ, excessive overtime work in Vietnam and Turkey or health and safety problems in the Dominican republic and Bangladesh.

In order to fully understand the causal model through which EPZs are expected to affect labour market outcomes, Figure 1 presents the logic model of change. The model ignores important elements about the effectiveness of EPZs such as the impact on exports, backward

linkages or technology diffusion, and focuses only on labour market outcomes. Also, Figure 1 focuses mainly on direct effects of the EPZs on labour market outcomes. Indirect effects could be important in some cases. For example, the remittances generated by EPZ workers may have significant employment effects on recipient areas.

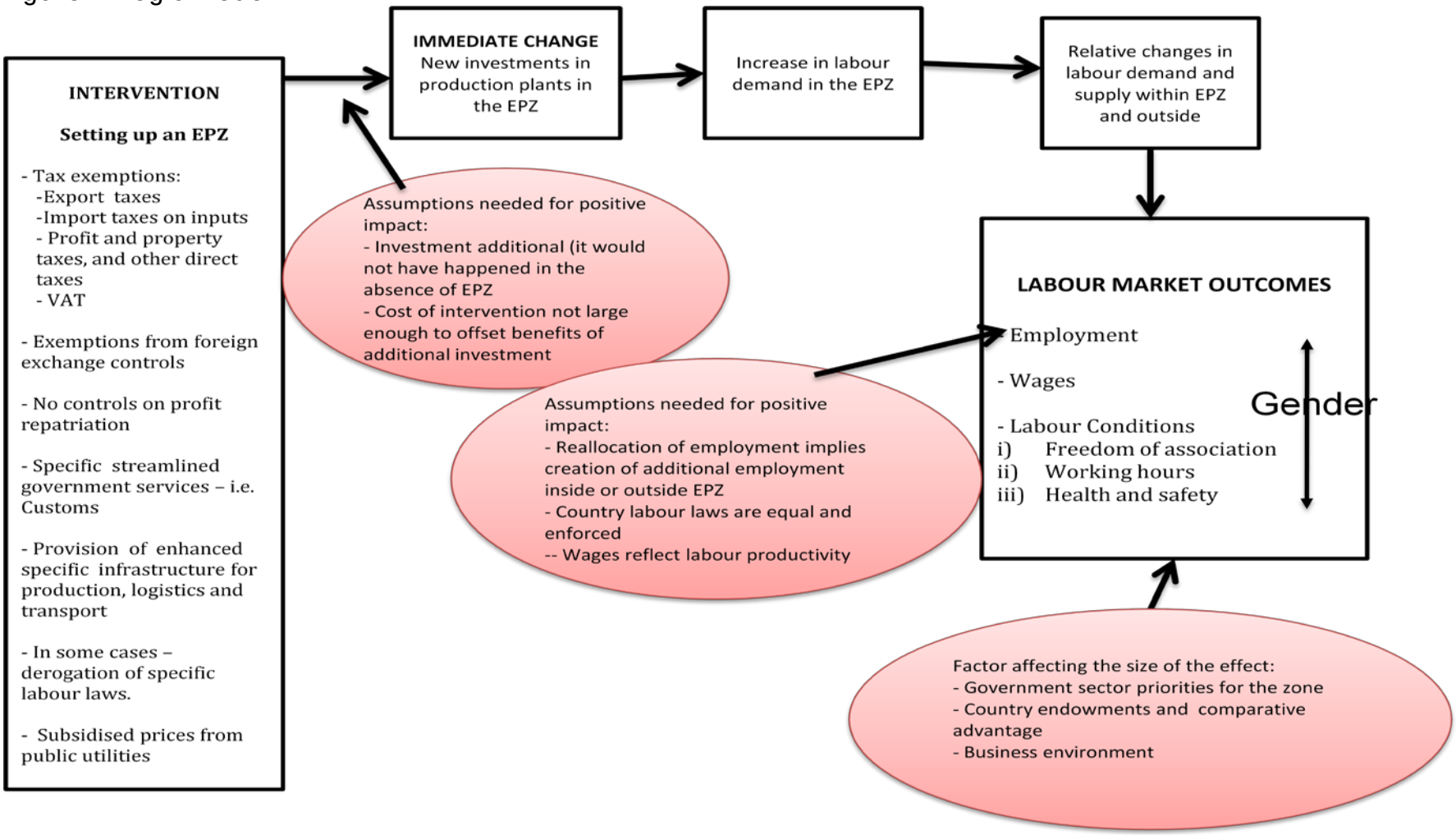
The figure shows how the different set of instruments described above aim to have an immediate effect on additional investment to locate in the zones and start producing export goods. This has an impact on employment, wages and labour conditions within the area and in the domestic economy, and in each of these outcomes the literature identifies potentially a differentiated gender impact.

It is important to highlight the fact that these labour market outcomes should be considered also in relation to the domestic economy. Regarding employment for example, the theoretical models is unclear about the expected impact of the EPZ, but the overall effect depends on whether it is only absorbing existing labour from domestic sectors or is creating new jobs. In other words, what matters is the total impact on employment and not only within the area.

Similarly, the impact on wages has two dimensions. First, the question is whether EPZs pay more or less wages than they would if they would allocate in the domestic economy. This is more important in cases where there are derogations of minimum wages within the zone. The second dimension is whether the impact on wages in the EPZs has an impact on the wage level of the entire economy. The importance of this economy wide effect on wages depends on the size of the EPZ in the economy.

In cases where there are derogations of labour laws, it is possible that labour conditions within the EPZ are affected. In this review we focus in three main elements: freedom of association, hours worked and health and safety conditions

Figure 1 Logic Model



A cross-cutting element across the three types of labour outcomes is the gender impact. Regarding employment, there is some evidence that EPZs tend to employ more women than men. A key question, however, is whether this is due to the sector composition of the EPZ, traditionally more female intensive sectors, or a preference of EPZs. This feminisation of the labour force in the EPZ may be related to large gender wage gaps, and, therefore, when looking at the impact of wages we also should consider the impact on gender pay. In addition, some case studies suggest that the reason for this feminisation of the labour force are related to larger ability of firms in EPZs to impose worse labour conditions to women than to men. One aspect that we will not address, however, is the impact of labour outcomes on women wellbeing. Although these may be important, they are out of the scope of this review.

The size of the impact or effectiveness of the interventions depends critically in a set of contextual factors. First, there is the type of sectors attracted to the EPZ. Negative outcomes on labour appear to be correlated mainly with labour intensive sectors such as clothing, footwear and low skilled electronics. Also, the capacity to attract different investments and the impact on labour depends, as the theoretical models suggest, in the factor abundance of the country.

Second, the type of labour institutions and the capacity to enforce the law is also important, since negative labour outcomes may occur on both the EPZs and the domestic economy when institutional capacity is weak. In addition, the comparison of labour outcomes needs to consider the existing business environment in and out the EPZ.

A final important consideration regarding the logic model is the need to consider the costs of intervention when evaluating the outcome. EPZs are second best interventions that carry out an implicit subsidy; for example the foregone tax revenue for the government. Even in cases where there is a positive impact on employment or wages, one should consider if these benefits outweigh the costs of the intervention. One problem, however, in this case is the fact that it is likely that some of the benefits of EPZs are mainly concentrated in other areas outside labour markets such as exports or spillover effects. As a result, we cannot compare the partial benefits or costs arising from labour outcome effects with the full costs of the intervention. This is a significant limitation of the review.

In defining the logic model of the intervention, we have done a first pilot search of the evidence. This indicates that we can group the studies in two types. The first and larger type of studies is case studies. These tend to provide a qualitative description of labour outcomes within EPZs and in some cases establish some descriptive comparison with labour market conditions in the rest of the economy. The ILO has commissioned over the last 30 years a long list of cases studies. There are also some surveys commissioned by the World Bank, and studies from trade unions and NGOs. This subset of studies is more important when describing labour conditions within the EPZ, but often lack adequate controls and counterfactuals for analysing the impact on employment and wages

A second type of studies is formal evaluations. This is a very small subset of studies carried out mainly by academics divided in two main types. Some studies have focused on cost benefit analysis of EPZs, including employment and wages. Other studies use econometric analysis in order to look at impact on wages and employment in the EPZ controlling for other factors and including employment and wage levels in the rest of the economy.

1.4 Why it is important to do this review

The large proliferation of EPZs is an indication of the importance of this instrument for industrial policy and export led growth. However, despite the increase and spread in the number of zones, there is little evidence on the additional effect that these have on employment and wages. More importantly, EPZs have been heavily scrutinized by civil society, often accused of employing a "race to the bottom"[4] in terms of labour conditions.

There is a very large literature in the area, including a few surveys, but no attempt has been made to our knowledge to synthesise the literature based on the logic model of change suggested by the theoretical literature. This is why this systematic review is important.

Finally, preliminary searches suggest that most of the evidence appears to be anecdotal and country and sector specific. This implies the need for understanding what the general lessons of this type of interventions are. This will allow policy makers and development practitioners to have a better understanding of the functioning of EPZs

[4] Se for example: INTERNATIONAL CONFEDERATION OF FREE TRADE UNIONS (ICFTU) (2004) "Behind the brand names: Working conditions and labour rights in export processing zones"

and the expected labour market outcomes, and to design policies that may assist on minimising any negative impacts.

2. Objective of the review

The objective of this review is to identify the impact that EPZs have on additional employment created, the wage level and labour conditions. Regarding labour conditions we focus on the impact on three elements: freedom of association, working hours and health and safety. It is also an objective of the review to review whether there is a specific gender impact related to these outcomes.

3. Methods

3.1 Criteria for considering studies for this review:

3.1.1 Types of studies

We will include studies that analyse the impact of EPZs on labour market outcomes in developing countries. We exclude studies that look at the impact of incentive zones in developed countries. We will also exclude studies that look at the impact of EPZs on exports, linkages, spillovers or investment. Although these elements are important when determining the effectiveness of an EPZ, these are out of the scope of the review, the labour market impact. Finally, we also exclude studies assessing the relation between exporting and FDI processes and labour outcomes that do not focus on assessing EPZ interventions.

Regarding the methodologies to be included in the review we will implement a variable approach according to the outcome variables to be analysed. The theoretical frameworks surveyed above give clear predictions on when an EPZ is welfare improving based on the impact on additional employment been created and changes in wages. In addition, some of the case studies based literature focus on differential labour conditions between inside and outside the zone, including lower wages.

For the case of employment and wages we focus on quantitative studies that use appropriate counterfactuals and adequate controls. In these cases, we expect study designs that range from econometric studies to more quasi-experimental approaches, such as propensity

score matching, or cost-benefit analysis. For the case of labour market conditions, we focus on quantitative and qualitative studies that compare conditions inside and outside the EPZ for comparable groups.

The choice of comparable group is problematic since it depends on the sector composition of firms within the EPZ. Ideally, we will select studies that use the same industry category sector and similar type of worker qualifications when comparing employment and wages between the EPZ and the rest of the economy. In addition, we will look at how representative are the sample for both groups.

Indeed, the selection of an appropriate comparable group is crucial for addressing the additionality of employment created by the EPZ intervention. To deal with net effects on employment, researchers need to take into account whether workers from counterfactual settings might be moving into the EPZ and more generally, whether the employment generated in the EPZ could be attracting individuals working elsewhere outside the EPZ rather than unemployed workers. The review will discuss the appropriateness of the approaches and counterfactuals used in the included studies to deal with the additionality of employment creation.

We treat gender as a component in each of these outcomes, and, therefore, we apply the same criteria for the inclusion of methodologies, quantitative for employment and wages, and more qualitative for labour conditions.

Concretely, we establish the following inclusion criteria for the review:

- Included studies need to provide at least a comparison with the same outcome outside the EPZ and for some comparable group (i.e. same ISIC sector, same worker category,..).
- For studies focusing on employment, included studies need to focus on some measure of "additionality" or "aggregate employment" or "net employment" effect for the economy.[5] It is clear that EPZs employ a significant amount of people, but it is less evident the extent to which this is additional to employment in other areas of the economy. This additionality of employment can also be justified when the study demonstrates additionality of investment (i.e. studies that show that investment would have not

[5] There exist already a few surveys that quantify the number of people employed in EPZs (see for example Singa Boyenge (2007)).

occurred outside the EPZ). The same applies to feminisation of employment. [6]

- For studies that focus on wages, we will include those that control for the wages at the same level of qualification and sector in and out the area. These include mainly econometric regressions of the wage premium within the EPZ, quasi-experimental approaches that look at wage differentials between workers that receive intervention (EPZ) and workers outside the EPZ and cost-benefit analysis.[7] We apply the same criteria when looking at the gender wage gap.
- For studies focusing on labour conditions, we will include those that provide information on comparable outcome variables and groups in and out the zone (i.e. average number of hours worked in the same ISIC sector inside and outside the zone)

Based on the search strategy, studies that comply with inclusion criteria above are included. These, however, correspond to studies in English, Spanish or Portuguese, which are the languages used for the search.

3.1.2 Types of interventions

Different EPZs imply a different set of interventions that are country and sector specific. The stylised incentive package is summarised in Section 1.2 above, but this package varies by zone. Although some of the tax incentives, for example, may be common in most special zones incentive packages, it is unlikely to find different zones with exactly the same array of incentives. In addition, the extent or quantification of the incentive is country specific since it depends on the opportunity cost of the intervention. For example, the value of subsidising infrastructure in a special zone depends on the state of national infrastructure and the use that the specific sector been targeted does of it.

This poses a challenge for this review. The fact that there are different degrees of intervention according to each zone, and that the size of each instrument is country and sector specific, implies that interventions are not equally comparable. This is an issue when looking at the degree of effectiveness of EPZs on our labour market

[6] It is difficult at this stage to specify the included study design. Pilot searches have not identifies any study that have addressed the issue of additionality of employment

[7] See for example Cling, Jean-Pierre & Razafindrakoto, Mireille & Roubaud, Francois, 2005. "Export processing zones in Madagascar: a success story under threat?," World Development, vol. 33(5), pages 785-803,

outcomes, since the impact on employment and wages, for example, may depend on the level of incentives firms in the EPZ enjoy.

The preliminary search of the literature indicates that most studies are country specific and, therefore, do not need to harmonise interventions. On the other hand, the few surveys that compare experience across countries do not consider the issue on how the type of intervention in each country affects the outcome.

Given the likely lack of information on the complete list of incentives and data to calculate their monetary value that would allow comparison across countries, we will mainly consider all EPZs as a single comparable intervention for employment and wages. When information is available we will group EPZs according to the main listed incentives, and use these groups to compare results.

In the case of labour conditions, we will, however, consider whether the zones have specific derogations that affect the outcome variables. For example, when looking at freedom of association we will consider only EPZs where there are specific provisions that allow firms in the EPZs not to allow freedom of association, or those cases where banning freedom of association occurs illegally.

In general, the main implication is the need for the review to focus more on the direction of the intervention effect rather than the size of the effect.

3.2 Types of outcome measures

3.2.1 Primary outcomes

The following primary outcomes measures are used in this review:

- Employment effect – this includes the coefficient for included studies that measures additional employment created or net employment effect (i.e. net employment). Also the coefficient that measures the gender effect.
- Wage effect – this includes the coefficient for included studies that measures the impact of the EPZ on wages, controlling for other factors that may affect individual wages (i.e. coefficient on EPZ dummy of wage equation or ratio of comparable wages of EPZs vis-à-vis national) and the gender gap.

We will also extract qualitative information regarding labour conditions. Concretely, we will focus on information about three main outcomes:

- Freedom of association – whether this is allowed within the area and the percentages of the labour force unionized inside the EPZ compared to the rest of the economy. Also by gender if information is available.
- Working hours – any information regarding working hours in the EPZ and in comparable sectors outside the EPZ. Also by gender.
- Health and safety – any information regarding health and safety conditions and how these differ to the rest of the economy.

3.3 Search methods for identification of studies

3.3.1 Electronic searches

This review will systematically search and collect evidence relevant to the review question. The use of electronic databases is an important part of this process which can be systematized by carefully documenting the search terms used for that purpose. The choice of search terms used in electronic searches will be made bearing in mind two polar opposite objective. Firstly, there is the need to capture all relevant studies or to minimize the probability of excluding relevant studies during electronic searches. Secondly, there is the need to minimise the probability of including irrelevant studies in electronic search results in order to keep a tab on the cost of the SR. A higher number of irrelevant studies in electronic searches will increase the costs because they will then need to be excluded as a later round of searches. This second round of searches will cost more time and, therefore, more money per study than the first level (electronic) searches because it is a manual process involving careful scrutiny of titles and/or abstracts of the studies selected during the first round.

This review will seek to balance the above (opposite) objectives during the electronic searches by carefully planning these searches in a way that they include all aspects of the review question while keeping other EPZ related issues out. This will be done by aligning the searches closely with the logic model in Figure 1. The idea here is to get each important aspects of the review question represented by a set of search terms. These sets can then be combined using logical operators such as AND or OR to construct search terms to be used with the

electronic databases. The preliminary searches reveal that five such sets of search terms are relevant for this review.

First set will define EPZs with following terms: “Special Economic Zone”, “Export Processing Zone”, “Free Trade Zone”, “Free Zone”, “Foreign Trade Zone”, “Industrial Parks”, “Industrial Estates”, and “Urban Enterprise Zone”. We will also use commonly used acronyms such as FTZ, EPZ, etc.

Second set will capture studies on the impact on employment by focusing on following terms: “Employment”, “Unemployment”, “Labour” and “Job”.

Third set will capture studies on the impact on wages: “Wages”, “Salary” and “Pay”.

Forth set will identify papers on labour conditions: “Quality of labour”, “Gender”, “Child labour”, “Low wage”, “Low pay”, “Health”, “Safety” and “Occupational hazards”.

We will include plural words and American spelling where relevant in the above key words. We will also translate the keywords above to Spanish and Portuguese and replicate the searches. Words for Spanish search would include “Zona franca”, “empleo”, “salarios”, “condiciones de trabajo”, “sindicatos” and for Portuguese search “Zona franca”, “emprego”, “salarios”, “Condições de Trabalho” “ sindicatos”.

These search strategies were informed and influenced by previous experiences of the researcher team as well as specialists at the Eppi-centre. The experience of the researchers in other systematic reviews is imminently relevant as those reviews also primarily relied upon the databases used here. This previous experience importantly includes specific insights into the peculiarities of each of the above electronic databases; particularly as pertaining to, sometimes undocumented, limitations of search engines servicing these databases.

The research team’s prior experience also emphasises the need to conduct pilot searches. Piloting searches can ensure that the results do not include irrelevant studies having similar words from other unrelated disciplines (this is specially the case when searching multidisciplinary databases using acronyms) and exclude relevant studies because they contain only synonyms of the keywords used here. An important element of this piloting includes checking that a set of relevant studies known to be listed in a given database do in fact

get picked up by the search terms implemented on that database. That way the pilot searches can help to refine and improve the search terms so that they filter in most of the known studies while at the same time filter out the irrelevant ones.

The four sets of search terms will be combined in a single main search term:

First Set AND (Second Set OR Third Set OR Fourth Set)

The following databases will be searched: Social Science Citation Index, IDEAS, International Bibliography of Social Science, EconLit, JOLIS, BLDS, ELDIS, Google, Google Scholar, Conference proceedings database in Web of Knowledge Index to Theses and the ProQuest dissertation database will also be searched to ensure maximal coverage of unpublished literature. Some of these databases, however, do not deal well with long and/or complex search strings (eg: IDEAS, BLDS, JOLIS). We anticipate that search strings will have to be changed and adapted, even simplified, to suit such databases. All these changes all these changes will be meticulously documented so that others may replicate our review.

We will also search manually on the ILO, UNCTAD and the World Bank, since these institutions may have relevant reports not indexed in the databases above.

The initial electronic search as well as the secondary search will be limited to titles, abstracts, and keywords (where available) for papers in the above databases. We will also focus all the searches to documents published after 1980. We will also use suitable options available in databases (e.g. automatic inclusion of additional word forms and synonyms in IDEAS) to appropriately focus the searches. The final extracted information as well as full text copies for key papers will be coded and managed using the EPPI-reviewer software.

3.3.2 Other searches

In addition to the above electronic searches we will hand search the ILO's Resource Guide on Export Processing Zones (EPZs) and key journals such as World Development, The World Economy or the Journal of Economic Surveys for specific papers in these areas. We will conduct bibliographic back-referencing and citation tracking of included studies, especially of key surveys of the literature. We will also contact

key authors in these areas in order to get access to ongoing and unpublished work.

3.4 Data collection and analysis

3.4.1 Selection of studies

The inclusion criteria described in section 3.1 will be applied successively to (i) titles and abstracts and (ii) full reports using the EPPI reviewer software. All searches will be uploaded in EPPI reviewer.

In the first stage, broad inclusion of studies will be carried out given the information on titles and abstracts. Included studies at this stage and studies where we have insufficient information for selection will be screened again in a second stage. At this stage, full reports will be obtained for those studies with insufficient information in order to determine whether they should be included in the final synthesis. This second screening stage will lead to the final list of included studies.

The process will be carried out separately by two researchers, and at the end of the process any disagreements in terms of inclusion will be solved with the intermediation of a third researcher.

3.4.2 Data extraction and management

The Research Officer will extract the information from included studies according to the Table in Appendix. Before starting with full data extraction, we will conduct a pilot stage where the RO and one of the reviewers will extract data independently from three studies, compare extractions, discuss discrepancies and shape the extraction method and definitions according to this comparison. In order to guarantee some further moderation and consistency, the researchers will randomly sample 5% of the studies and ensure that appropriate data is extracted for each study.

All the information will be uploaded and managed in the EPPI reviewer. For included studies, we will extract the information in EPPI reviewer according to the first column in the Table in the Appendix, and the RO will introduce the extracted information in the database.

In the case of quantitative studies outcome coefficients and their standard errors will be exported from EPPI reviewer to excel, and if

there is a significant number of studies that allow meta-analysis, this would be carried out in STATA.

3.5 Assessment of risk of bias in included studies

The assessment of risk bias depends on the study design and the methodologies used. The general elements that will be assessed and codified across studies are:

- Appropriate comparison group
- Representative sample
- Ability to determine causal relationship
- Extent to which comparison group can be isolated from intervention effects
- Justification for the selection of particular specifications or methods
- Robustness checks

Based on the pilot searches, we expect some of the elements discussed above to be more important than others when assessing biases for each type of studies. Concretely, some of the key issues appear to be:

- Employment. How the additionality of employment or net employment creation is calculated. If a labour equation is used, whether there are the right controls for endogeneity or selection bias (if applicable). For cost-benefit studies, we will analyse the quality of the counterfactual, and the way how the costs and benefits are calculated
- Wages. For econometric specifications, the same as above. For quasi-experimental studies whether a difference-in-differences approach is used and the quality of the models that implement the matching process.
- Labour market conditions. Since we are expecting here mainly case studies, two main issues for bias are expected. First, how appropriate are the comparison groups inside and outside the EPZ (i.e. same sector activity, etc). Second, if there is any discussion of external factors that may be affecting different outcome inside and outside the EPZ.

3.6 Unit of analysis issues

In the case of employment and wages, it is unlikely that we can compare size effects across studies. This is due to the fact that it is likely that the units in which the main variables are measured differ. More importantly, for the case of econometric estimates it is likely that the reduced form specifications across the few studies included are different. In cases where information is provided in terms of additional or net employment, we will standardise the outcome variable dividing by the total labour force in the country as reported in the world development indicators.

In the case of labour conditions, work hours and right to be unionised are directly comparable, but it is unlikely to find health and safety outcomes comparable unless they are expressed in monetary value. If this is the case, and when costs are expressed in domestic currency, we will convert figures in dollar terms.

3.7 Dealing with missing data

Studies with missing data will not be included.

3.8 Assessment of heterogeneity and subgroup analysis

Heterogeneity across studies is an important element of this review. As explained above it is unlikely to find a pair of EPZs with an equivalent degree of incentives and sector priorities. In addition, EPZs range from single firms to entire regions. These differences can be critical in explaining some of the impact on labour market outcomes. For example, sector composition is key for salaries depending on labour intensity, or the size of the EPZ may be relevant for collective bargaining and trade unions representation.

As we describe below we do not envisage a significant number of studies that would allow implementing meta-regression in order to identify the main sources of heterogeneity in the results. As a result, our approach will be to decompose and compare the results when studies are grouped according to the type of EPZ described in the table in the Appendix. Concretely, when information is available, we will compare the results by geographical coverage, region, sector composition and type of incentives.

3.9 Assessment of reporting biases

The exclusion of studies that do not provide a sound comparison group between labour market outcomes in and out the EPZ between similar

groups will minimise the risk of reporting bias. We will provide, however, a qualitative assessment of how appropriate is the comparison groups, and more importantly, the specific bias risks of not controlling for other factors for studies that do not use quantitative methodologies.

We are including both published and unpublished material. In fact, we expect a very low number of studies published in academic journals, and, therefore, there is little risk for publication bias. However, one potential source of bias that may arise in this review is the fact that different organisations commissioning studies may have different agendas in this area. For example, reports commissioned by the ILO or trade unions may focus on highlighting those cases where there are problems with labour conditions to push the agenda on better labour conditions. Other institutions related to EPZs may have an interest on increasing investment on EPZs and, therefore, focus very little the evaluations on problems related to employment or wages. As a result of these potential biases we will give a higher qualitative weight to independent academic studies, and compare the results between academic and non-academic studies.

3.10 Data synthesis

The process of synthesis is shaped by the logical framework in Figure 1. The synthesis is organised according to the different labour outcomes above, including a cross-cutting gender dimension, and looking at the effect of different contextual factors using the sub-group analysis described above.

Table 4 below shows the criteria of synthesis along these two dimensions and how the synthesis will be structured. We will synthesise the effect of the EPZs at each outcome, looking also at the potential differential effect on gender. Then the synthesis will focus on how these results depend on the type of EPZs.

Table 4 criteria for synthesis of the impact of EPZs

Impact on outcomes →	Employment	Wages	Labour conditions		
			Freedom of association	Working hours	Health and safety
	→		Gender impact		→

Does synthesis results depend on ☐					
Region					
Type					
Main sector					
Type of Incentives					

For employment and wages, the review will synthesise quantitative studies included for these outcomes. Pilot searches indicate that it is very unlikely that we find a significant number of studies that comply with the inclusion criteria, and even more unlikely to find different econometric studies with the same methodology that would allow meta-analysis.

When enough information is available regarding the mean or standard deviation of the dependent variable, we will statistically transform regression coefficients into ratio estimates and present these ratios with their 95% confidence intervals using forest plots. Depending on the summary statistics available for the dependent variable, we will use Cohen's d standardized mean differences or response ratios. The former measure standardizes the impact effect β using the standard deviation of the outcome variable (Cohen's $d=\beta/\sigma_Y$). The latter uses the outcome variable mean ($RR= (\beta+ \mu_Y)/\mu_Y$).

All the results will be presented in a summary table, which will include information on the type of intervention and quality assessment.

Based on the synthesis of the effect on each individual output and across EPZs types, we will draw some general conclusions about the expected impact of EPZs on labour outcomes, the most important contextual factors affecting these impacts and the main problems found on the reviewed studies.

3.11 Sensitivity analysis

Comparing the synthesis results from grouping the studies according to the types of EPZs and also according to their quality will provide a clear idea on how the results are sensitive to specific factors and study design issues. We will also use group analysis to explore any other important contextual factor that may be identified during the review.

More importantly, in order to provide quality assurance of screening and synthesis we will use three advisors with relevant experience as practitioners in the area of EPZs. Dr Ricardo Markwald will provide quality assurance given his experience in both academic and policy in the area of trade policy. Dr Helson Braga will provide advice and quality assurance given his enormous experience on EPZ management and as a member of the board of the World Economic Processing Zones Association (WEPZA). Finally, Dr. Thomas Farole at the World Bank will also provide quality assurance. Dr Farole has edited several books about the impact of EPZs on developing countries (Farole (2011), Farole and Akinci (2011)).

3.12 Process evaluation – qualitative analysis – and Applicability

Regarding labour condition outcomes, we will carry out a qualitative synthesis focusing on the quality of the findings, comparing results and suggesting common patterns. The synthesis of results will then take into consideration any changes when studies are grouped by the factors outlines in Table 4 on the types of EPZs and interventions.

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Time-table

	September	October	November	December	January	February	March	April
Submission of protocol	■							
External review	■	■	■	■				
Final protocol		■	■	■				
Searches stage					■	■		
Screening stage					■	■		
Data extraction					■	■		
Synthesis					■	■		
First draft					■	■		
Review first draft						■	■	■
Final draft								■

Acknowledgements

We would like to thank 3ie for financial support.

Contribution of authors

Xavier Cirera will lead the review and will primarily responsible for managing the project, perform the synthesis and draft the protocol and report.

Rajith Lakshman will be involved in performing the searches, assist with screening, data extraction and draft parts of the report.

Stephen Spratt will contribute to the qualitative synthesis and provide quality assurance.

Declarations of interest

We declare that the contributing authors of this review have no conflict of interest of any type carrying out this review.

Appendix

Data extraction

General Information	Author, publication date, publication type, journal, year, funding agency, author affiliation, abstract.
Type of EPZ	
Geographical coverage	Country, Region, city, firm
Sector composition	Main sectors included in the EPZ
Incentives	Incentives available
Results	
Type	Focus of the study based on the impact on the following outcomes: - Employment - Wages - Labour conditions • Freedom of association • Working Hours • Health and safety
Sample	Country, region or cross-section Period of study
Main results	Summary of main findings
Methodological Approach	Econometric Analysis Qualitative case study Cost Benefit
Main outcomes	- Additional/Net Employment generated – by sector, gender,.. - EPZ Effect on wages – by sector, gender,.. - Labour conditions • Description and comparison of freedom of association within and outside the EPZ. • Description and comparison of Working Hours within and outside the EPZ.

	• Description and comparison of Health and Safety within and outside the EPZ. For econometric estimates, extraction of standard errors, sample size, R2
Methodological issues	- If econometric methodology - estimator type - Quality of comparison between relevant groups within and outside the EPZ - Control for other factors that may affect the effect of EPZs
General validity assessment	- Appropriate comparison group - Representative sample - Ability to determine causal relationship - Extent to which comparison group can be isolated from intervention effects - Justification for the selection of particular specifications or methods - Robustness checks
Other	Other relevant information about context of intervention

Sources of support

Technical and financial support from 3ie.

[THE FOLLOWING SECTIONS ARE TO BE COMPLETED AT REVIEW STAGE]

Heading for this section: Results

Subheading: Results of the search
Subheading: Description of the studies
Subheading: Included studies
Subheading: Excluded studies

Subheading: Risk of bias (quality assessment) in included studies

Subheading: Effects of interventions

Subheading: Analysis of heterogeneity

Subheading: Sensitivity analysis

Subheading: Analysis of process

Subheading: Applicability

Heading for this section: Discussion

Subheading: Summary of findings (includes Cochrane-style summary of findings table)
Subheading: Overall completeness and applicability of evidence
Subheading: Quality of the evidence
Subheading: Potential biases in the review process
Subheading: Agreements and disagreements with other studies or reviews

Heading for this section: Authors' conclusions
Subheading: Implications for policy and practice
Subheading: Implication for research

Heading for this section: Time-table

Heading for this section: Acknowledgements

Heading for this section: Contribution of authors

Heading for this section: Declarations of interest

Heading for this section: Tables

Heading for this section: Appendix (e.g. screening and data extraction sheets etc.)

Heading for this section: Figures

Heading for this section: References

Subheading: Included studies

Subheading: Excluded studies

Subheading: Additional references

Heading for this section: Sources of support

Subheading: Internal

Subheading: External

Annex 1: Guidance on programme theory development

A programme theory model helps make a review relevant to policy and practice. Logical frameworks, based on programme theories of change, are key components of policy planning and practice in intervention organisations.

A programme theory or logic model is used to understand the theory of change underlying a complex intervention which entails incentivizing social and/or behavioural change. According to Anderson et al.,[8] a programme theory assists the systematic reviewer in:

1) Scoping the review, including refining the review question, deciding on 'lumping' or 'splitting' a review topic, and identifying intervention components.
2) Defining and conducting the review, including identifying relevant study inclusion/exclusion criteria, guiding the literature search strategy, guiding the data collection including examination of process and implementation issues, and guiding the analysis of heterogeneity and moderator effects.
3) Presenting the review and making it relevant to policy and practice, including structuring the primary and secondary outcomes reported, including intended and unintended, beneficial and adverse effects, and explaining and interpreting results.

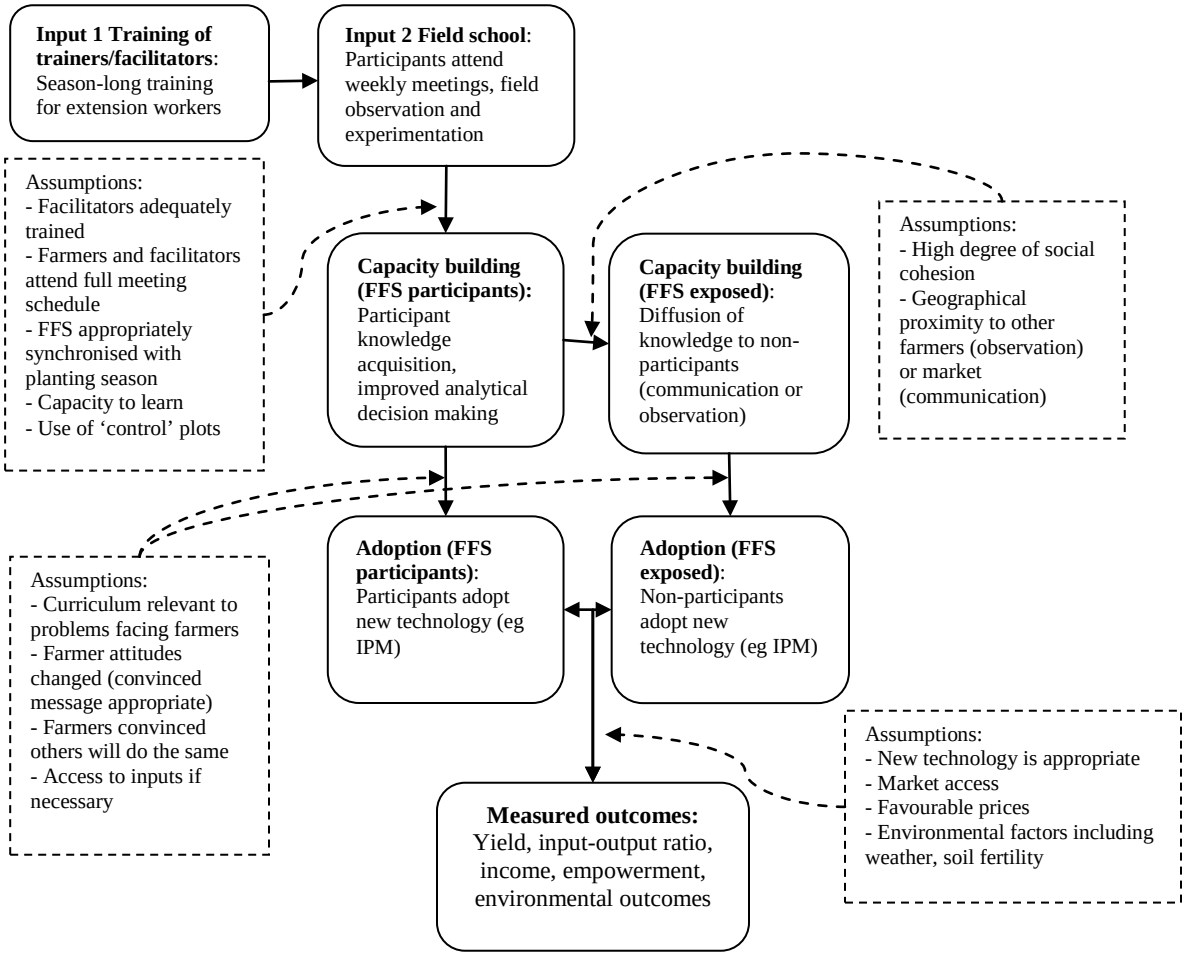
A programme theory model is a diagrammatic representation of the theory of change which links the intervention and the outcomes of interest. A programme theory should show the intermediate steps in the causal chain linking the intervention with intermediate and final outcomes, and present key underlying assumptions driving changes at each step. It may include also key contextual factors (economic, social and political) which are important in determining effectiveness.

An example is presented in Figure 1, for the farmer field school approach to farmer training. The intervention aims to influence direct beneficiaries who receive the training, and indirect beneficiaries who are 'exposed' to the training, usually by living in close geographical proximity to field school participants or through their social networks. Underlying each link in the causal model are a number of assumptions regarding process and implementation which determine the extent of

[8] Anderson, L. et al. (forthcoming) "Using Logic Models to Capture Complexity in Systematic Reviews.", *Research Synthesis Methods*?

behaviour change by each group of farmers, and therefore the extent to which intermediate and final outcomes improve. Key process and implementation factors determining effectiveness include the quality of facilitator training, the relevance of the curriculum to the problems facing the farmers, the extent to which farmers believe the message is beneficial, and the degree of spillovers between direct and indirect beneficiaries. Key contextual factors determining effectiveness include the farmers' capacity to learn, the economy and the weather.

Figure 1 Example programme theory: Causal model for the farmer field school (FFS) agricultural training intervention



Source: Waddington, H, Snilstveit, B. et al. (forthcoming) The impact of farmer field schools: A systematic review, International Initiative for Impact Evaluation, New Delhi.