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Animal Health Policy and Practice: Scaling-up Community-based Animal Health Systems, Lessons from Human Health

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PREFACE

This is the 22nd of a series of Working Papers prepared for the Pro-Poor Livestock Policy Initiative (PPLPI). The purpose of these papers is to explore issues related to livestock development in the context of poverty alleviation.

Livestock is vital to the economies of many developing countries. Animals are a source of food, more specifically protein for human diets, income, employment and possibly foreign exchange. For low income producers, livestock can serve as a store of wealth, provide draught power and organic fertiliser for crop production and a means of transport. Consumption of livestock and livestock products in developing countries, though starting from a low base, is growing rapidly.

The core of this paper is devoted to elaborating six criteria for assessing community-based animal health systems, which the author adapts from studies on primary healthcare systems for humans. She argues that the criteria – equity, efficiency, accessibility of services, quality of services, human resources and financial resources – must be addressed when scaling-up community-based programmes.

We hope this paper will provide useful information to its readers and any feedback is welcome by the author, PPLPI and the Livestock Information, Sector Analysis and Policy Branch (AGAL) of the Food and Agriculture Organization (FAO).

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Keywords

Animal health, community-based systems, livestock, poverty, equity, efficiency, accessibility of services, quality of services, human resources and financial resources.

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ACRONYMS

AH	Animal health
AHA	Animal health assistant
AHS	Animal health service
AHT	Animal health technician
ATP	Ability to pay
AU/IBAR	African Union/Inter-African Bureau for Animal Resources
CAH	Community-based animal health
CAHW	Community-based animal health worker
CHW	Community-based health worker
DfID	Department for International Development (UK)
FFS	Fee for service
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit GmbH (German Society for Technical Cooperation)
HH	Human health
IFAD	International Fund for Agricultural Development
MoA	Ministry of Agriculture
MoH	Ministry of Health
MoL	Ministry of Livestock
NAHS	National animal health service/system
NGO	Nongovernmental organisation
NHS	National health service/system
OIE	World Organisation for Animal Health (Office International des Epizooties)
PAHC	Primary animal healthcare
PHC	Primary healthcare
PRA	Participatory rural appraisal
RRA	Rapid rural appraisal
SAP	Structural adjustment programmes
SARS	Severe acute respiratory syndrome
UNICEF	United Nations Children's Fund (formerly United Nations International Children's Emergency Fund)

VAHW	Village animal health worker
WHO	World Health Organisation
WTO	World Trade Organisation
WTP	Willingness to pay

Background

Delivering services in rural and marginalised areas of developing countries has been and remains of great concern in the development arena. Although such services exist in many sectors, the literature concerning community-based health workers in the human health sector is especially rich. Similarities between human and animal health systems, especially regarding economic analysis and funding mechanisms have been reviewed previously while other authors have studied their structures and delivery channels. This study focuses on the extensive experience in the human health sector regarding policy implications of community-based health initiatives.

While the two systems do not share the same ethical dimensions, they have gone through similar situations, especially regarding finance. Interestingly, their governance greatly differs. Most developing countries were constrained by structural adjustment programmes to cut spending. On the human health side, international organisations and ministries of health launched a worldwide initiative in 1978 in Alma Ata to ensure that primary healthcare (PHC) was available in rural areas. From this initiative arose the 'community-based health worker'.

Although the same budgetary constraints affected the animal health (AH) sub-sector, authorities have not attempted a similar coordination of animal health services (AHS), especially in rural and remote areas. And, a decade after the World Bank released privatisation guidelines for the livestock sector in 1991-92 with the aim of improving AH systems' efficiency and effectiveness whilst reducing public expenditure, the results have not proved to be as expected. NGO-led community-based animal health (CAH) activities expanded in marginalised rural areas, but with few linkages with the ill-equipped national animal health systems (NAHS). Debate regarding community-based schemes in the AH field started as a consequence of the rapid increase of these initiatives. By contrast, the human health sector underwent policy analysis at the ministerial and institutional levels at a much earlier stage.

Justification

It is therefore not surprising that concerns similar to those raised in the human health field are currently being debated in the area of AH. Issues such as the quality of care, accessibility and sustainability are at present hotly debated in the animal healthcare arena at the national and international level. This discussion arises from two main causes. First, significant effort is currently focused on institutionalising CAH systems in developing countries. One of the aims is to obtain wider and more coherent AHS coverage at the national level as a prerequisite of regional and/or bilateral trade agreements. Second, community animal health workers (CAHWs) are seen as important players in achieving poverty-reduction development goals for the livestock-dependent poor.

Although research has been undertaken on several technical aspects of CAH systems as a consequence of the privatisation process, little attention has been given to policy analysis. As a consequence, CAH services tend to be weakly linked to national structures, making it difficult to integrate rural areas into NAH programmes. This study focuses on the reasons why CAH systems have often been excluded from the wider AH policy debate and why interest is currently increasing in their inclusion. It is argued that financial constraints and the privatisation process are not the only reasons for the apparent hesitant support CAH initiatives have received.

Objectives

The objectives¹ of the review are fourfold:

1. To place CAH programmes within the context of animal health policy.
2. To elaborate the criteria against which CAH initiatives should be evaluated within a national animal health system (NAHS).
3. To identify regional differences between CAH initiatives.
4. To elaborate policy recommendations on how to support CAH systems and integrate them into a wider national animal healthcare structure.

Conclusions

To objective 1

At the same time that PHC was implemented, NGO-led CAH systems started growing in rural areas to overcome the lack of AHS delivery and fill the supply gap for these services. While ethical objectives drove PHC, economic growth remained at the centre of CAH initiatives. And, whereas PHC was perceived by local communities and researchers as top-down, CAH programmes were community generated. While the AH sector lacked institutional focus, the human health counterpart lacked participatory rural appraisal methods to increase community involvement in implementation.

Comparative analysis of the animal and human health sectors reveals gaps in the evolution of CAH systems within the animal health system. These are mainly institutionalisation of CAHWs, monitoring of these community workers and governance in animal health service delivery in rural and remote areas. CAH systems thus have to be put into a wider policy context labelled primary animal healthcare (PAHC) to improve existing service delivery in rural areas through CAHWs.

To objective 2

Six main criteria have been devised to guide assessment of CAH initiatives within the context of PAHC delivery. These criteria are equity, efficiency, accessibility and quality of services provided, human resources and financial resources. Given the similarities between human and animal health service delivery in rural areas, these criteria need to be taken into account when considering the scaling-up to the national level of community-based programmes. Choices and valuation of trade-offs between them will be heavily influenced by political decisions at the national and/or local level.

To objective 3

Although the literature on CAH systems in certain geographical regions such as Latin America and West Africa is relatively scarce, regional differences have been highlighted. Most of the reviewed initiatives prioritise the sustainability of CAH systems, but monitoring models differ. Whereas in Asia most initiatives link CAHWs with government staff, in East Africa linkages are more likely to be established with private veterinary practitioners, resulting in significantly lower government involvement than in Asia. It seems, however, that the need to institutionalise CAHWs

¹ To attain these objectives, a review of selected community-based animal health systems has been performed (see table 1) in addition to the extensive literature existing on PHC initiatives. The main criterion for CAH programmes inclusion was their intention of up scaling CAH initiatives¹ towards a primary animal healthcare (PAHC) system (i.e. their integration in a wider national animal health policy).

is now recognised internationally and that reluctant members of the veterinary profession, especially in East Africa, are becoming more aware of the usefulness of these workers in delivering services in rural areas.

To objective 4

Scaling up CAH systems into a nationwide delivery scheme requires support at several levels. Policy recommendations for the national animal health system to strengthen the process are the following:

- Clearly state the NAHS overall animal health objectives;
- Facilitate a platform for dialogue between NGOs and existing national structures for coordinating field activities and so obtain more equitable and consistent AHS delivery in rural and remote areas;
- Improve equity in the PAHC system by promoting the institutionalisation and recognition of CAHWs and a standardised curriculum² for CAHWs defining training periods and tasks while maintaining enough flexibility to adapt services to the AH needs of different parts of the country.

² When these have not already been implemented.

Background and justification

Delivering services in rural and marginalised areas of developing countries has been and remains of great concern in the development arena. Although such services exist in many sectors, the literature concerning community-based health workers (CHW) in the human health (HH) sector is especially rich.

We have already discussed the similarities between human and animal health systems, especially regarding economic analysis and funding mechanisms (1, 2). Additionally, Leonard (3), Redmond (4) and others (5, 6) have pointed out the parallels between these sectors in their delivery channels and structures. This study will therefore focus on the extensive experience in the human health sector regarding policy implications of community-based health initiatives.

While the two systems do not share the same ethical dimensions, they have gone through similar situations, especially regarding finance. Interestingly, their governance greatly differs. Most developing countries were obliged by structural adjustment programmes to cut spending. On the HH side, ministries of health and international organisations, including the World Health Organisation, launched a worldwide initiative in 1978 in Alma Ata to ensure that primary healthcare (PHC) was available in rural areas. From this initiative arose the 'community-based health worker'.

Although the same budgetary constraints affected the animal health (AH) sub-sector, authorities have not attempted a similar coordination of animal health services (AHS), especially to serve rural and remote areas. And, a decade after the World Bank released privatisation guidelines for the livestock sector in 1991-92 with the aim of improving AH systems' efficiency and effectiveness whilst reducing public expenditure (7, 8), the results have not proved to be as expected (9). NGO-led community-based animal health (CAH) activities expanded in marginalised rural areas, but with few linkages with the ill-equipped national animal health systems (NAHSs). Debate regarding community-based schemes in the animal health field has started as a consequence of the rapid increase of these initiatives. By contrast, the human health sector undertook analysis of policy implications at ministerial and institutional levels at a much earlier stage.

It is therefore not surprising that concerns similar to those raised in the human health field are currently being debated in the area of animal health. Issues such as the quality of care, accessibility, sustainability, equity and efficiency are at present hotly debated in the animal healthcare arena at national and international levels (e.g. OIE and AU/IBAR). This discussion arises from two main causes. First, significant effort is currently focused on institutionalising CAH systems in developing countries. The aim is to obtain wider and more coherent AHS coverage at the national level to enable regional and/or bilateral trade agreements. Second, CAHWs are seen as important players in achieving poverty-reduction development goals for the livestock-dependent poor.

Since the beginning of the debate in the late 1980s, regional differences regarding the evolution and implementation of these systems have been put forward. Thus, CAH initiatives have generally been more accepted in West Africa than in East Africa (10). In the latter, NGOs have been highly active in promoting the CAH approach. Little literature exists on CAH systems in Latin America, though references point out that such services have been running for several decades (11). In Asia, CAH systems exist but government involvement in CAHW training and organisation seems to be higher than in other regions (12, 13).

Although research has been undertaken on several technical aspects of CAH systems as a consequence of the privatisation process, little attention has been given to policy and institutional issues. Few authors have examined CAH systems with a policy perspective (see for example A. Catley and T. Leyland [14]). As a consequence, CAH services tend to be weakly linked to national structures, making it difficult to integrate rural areas into NAHS programmes.

The purpose of the study is not to give a historical perspective on CAH systems, nor to examine the technical limitations hampering their performance. The study focuses on the reasons why CAH systems have often been excluded from the wider animal health policy debate and why interest is currently increasing in this area. It is argued that financial constraints and the privatisation process are not the only reasons for the apparent faltering support CAH initiatives have received.

Objectives

The objectives of the review are fourfold:

1. To place community animal health (CAH) programmes within the broader context of animal health policy.
2. To elaborate the criteria against which CAH initiatives should be evaluated within a national animal health system (NAHS).
3. To identify regional differences between CAH initiatives.
4. To elaborate policy recommendations on how to support CAH systems and integrate them into the wider national animal healthcare structure.

Methodology and materials

To attain these objectives, selected community-based animal health systems and the extensive literature on PHC initiatives were reviewed (see table 1). The main criterion for CAH programmes inclusion was their intention of up scaling CAH initiatives³ towards a primary animal healthcare (PAHC) system (i.e. their integration in a wider national animal health policy).

Organisation of the report

The report is divided into five sections. Section 1, the introduction, provides the background and objectives of the study. Section 2 gives an overview of the origin and concept of PAHC in light of the human health counterpart, primary healthcare (PHC), as well as a definition of a community animal health worker. Section 3 sets the criteria for evaluating community-based animal health programmes: equity, efficiency, accessibility of services, quality of services, human resources and financial resources. Section 4 focuses on the factors influencing the scaling up of CAH systems into a nationwide service delivery scheme in rural and remote areas. Issues such as institutionalisation of CAHWs, monitoring systems and governance of PAHC are discussed. Section 5 sets forth the conclusions of the study as well as policy recommendations related to the guidance and support needed when scaling up national animal health services delivery through CAH systems.

³ Understood by the high number of trained workers in the reviewed programme and/or because it is stated in the aims of the programme.

Table 1: Selected review of community-based animal healthcare projects

Project start	Country/Areas	Name given to the worker	Entity/ies involved in the project	Funding sources for workers	Num. workers trained	Source
1994	Afghanistan (Daye Chopan)	Basic veterinary workers	Vet Aid	<ul style="list-style-type: none"> Training provided by Vet Aid Earnings from profit made from selling drugs 	not available	T. Leyland (15)
1993	Malawi (Northern)	Village keymen	Mzuzu Agricultural Development Division (Division of Veterinary Office)	<ul style="list-style-type: none"> Drug revolving fund 	33	K. Huttner <i>et al.</i> (16)
Early 1990s	Ethiopia	CAHWs	Government of Ethiopia and NGOs (not specified)	<ul style="list-style-type: none"> Training provided by the government and NGOs Source of earnings for the worker not specified 	1,500	B. Admassu (17)
1992	Somalia (Sanaag area)	CAHWs	Action Aid/Vet Aid	<ul style="list-style-type: none"> Training provided by MoL Revolving drug fund (community) 	30	A. Catley (5)
1986	Somalia	Nomadic animal health assistant	GTZ	<ul style="list-style-type: none"> Government-managed revolving drug fund 	54	A. Catley (5)
1995	Ethiopia (Somali National Regional State)	CAHWs	Save the Children UK	<ul style="list-style-type: none"> Revolving drug fund 	45 (27 left in 1996)	A. Catley (5)
1994	Kenya	Daryelles	Oxfam UK / Wajir Development Project	<ul style="list-style-type: none"> Pastoral association 	87	A. Catley (5)
1996	Southern Sudan	CAHWs	UNICEF / Operation Lifeline Sudan	Not available	563	A. Catley <i>et al.</i> (18, 19)
1993	Sudan (North and South Kordofan States)	Community-based AHWs (CBAHWs)	IFAD / Operation Lifeline Sudan / Tufts University / NGOs	<ul style="list-style-type: none"> Given basic drug kit Small initial grant to purchase drugs Fee for service 	234	IFAD (20)
1994	Ethiopia (Afar region)	CAHWs	Pan African Rinderpest Campaign	<ul style="list-style-type: none"> Profits made from selling drugs 	20	A. Catley <i>et al.</i> (18, 19)

2001	Southern Sudan	CAHWs	Operation Lifeline Sudan	Not available	1,400	B. Jones (21)
1981	Nepal	Village animal health workers	United Mission to Nepal	<ul style="list-style-type: none"> ▪ Paid by Nepalese government 	2,000	K. Stoufer <i>et al.</i> (22)
1996	Indonesia (Sumatra)	CAHWs	Government of Indonesia in collaboration with DfID DELIVERI project	<ul style="list-style-type: none"> ▪ Fee for service ▪ Soft loans from the district veterinary service 	161	C.S. Leksmono (23)
1984	Thailand	Village keymen	Government (Department of Livestock Development) with assistance of GTZ	<ul style="list-style-type: none"> ▪ Training and extension provided by the government of Thailand ▪ Drug supply through revolving fund 	2,100	GTZ (12)
1998	Cambodia	Village animal health workers	IFAD and the government of Cambodia	<ul style="list-style-type: none"> ▪ VAHWs associations ▪ District cooperative pharmacies (membership contribution) ▪ Fee for service 	6,129 (IFAD contributed to the training of 1,120)	IFAD (13)
1991	Bolivia	CAHWs	Local farmers' organisations, a local NGO (Fundacion Integral de Desarrollo), and international NGOs (World Concern /Christian Veterinary Mission and Heifer Project International)	Not available	1,500 villagers and 24 CAHWs	S.E. Steward (24)
1998	Peru (Puno)	Sanitarios ganaderos	CARE Puno	<ul style="list-style-type: none"> ▪ Start up kits with credit ▪ Asociación de Sanitarios Ganaderos (membership organisation) 	14	CARE Peru (25)
1993	Ghana	Community livestock worker	IFAD, ActionAid		1,007 trained (54 of them evaluated)	Hanks <i>et al.</i> (26)

Origins of PHC and PAHC

One of the main differences between community-based human and animal health systems is their origin. Community-based initiatives in the HH field started in 1978 with the launch of an initiative at ministerial level. Although the approach was supposed to be participatory (i.e. bottom-up), community-based initiatives formed an integral part of the MoH of the countries that agreed upon the PHC concept and were consequently implemented under MoH guidance (i.e. top-down). Thus, PHC literature is rich in examples of nationwide initiatives to organise, train and finance CHWs. Less abundant are examples of small-scale NGO-led CHW projects, which have tried to be more participatory in their training and methodologies to increase community participation and system sustainability (27-29).

Conversely, the PAHC approach derives from the downsizing of NAHS. During the structural adjustment programme (SAP) period, the gap in service delivery in rural and remote areas with regard to AH started widening. Several NGO-led activities began in rural and pastoral areas to meet demand for AH services from livestock keepers (see for example the case in Afghanistan [15]). Methods for assessing the AH problems in these areas were explored. As a response, rapid rural appraisal (RRA)⁴ methodologies were designed to “use farmers’ knowledge and skills when planning development projects” (30). RRA evolved into participatory rural appraisal (PRA), the main difference being farmers’ involvement in analysing problems and formulating solutions. These techniques started being widely used especially in the agricultural sector during the 1970s.

The main difference between community-based initiatives in the two sectors relates to their strategic planning and governance (see figure 1 below). Community-based health systems tended to be implemented in a relatively hierarchical manner. Nitcher pointed out in 1986 that “while the primary healthcare concept may have been developed in the name of people, it is beginning to appear to many field staff as top down and better serving political interests of speech makers rather than either health centre staff or the community” (31). Considerable debate has concentrated on the lack of participatory methods in the implementation of such systems in HH (32). Conversely, CAH initiatives tended to proliferate from grass-root projects, seemingly without coordination. The aim here is to highlight how initial policy conditions may influence the development of initiatives.

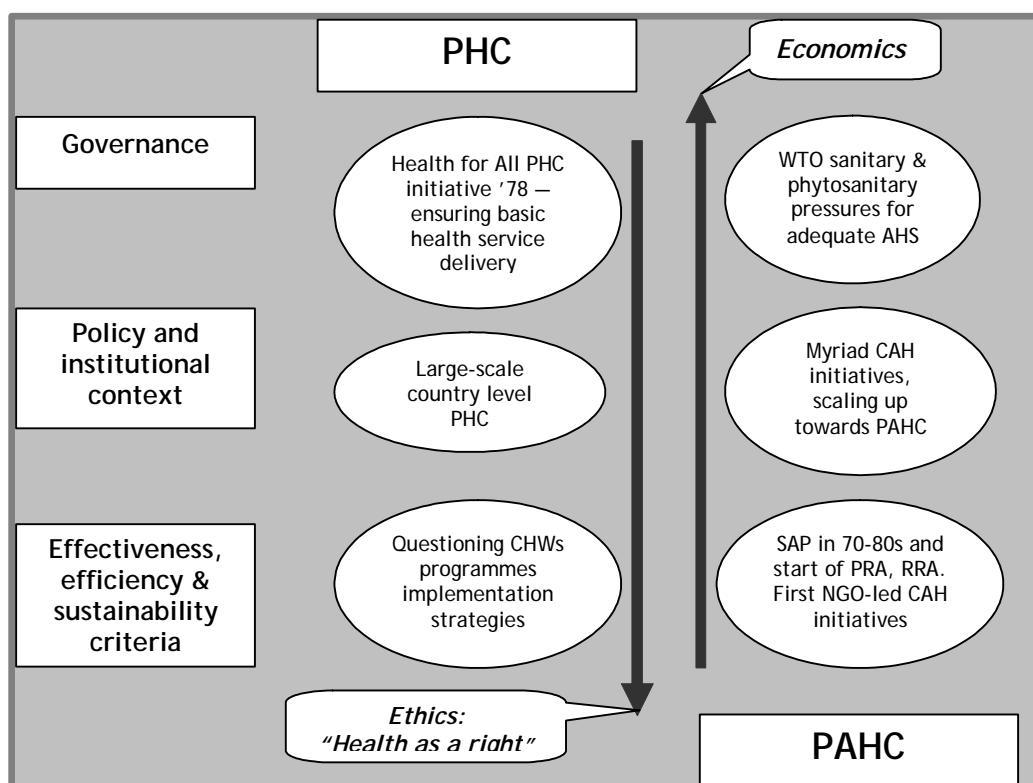
It is important, though, to point out the apparent convergence of these two systems. On the one hand, research on PHC initiatives tends to question the sustainability and initially assumed cost-effectiveness of the approach⁵ (28). Furthermore, techniques have been sought for increasing community participation and integration of CHWs into the PHC initiative. As Walt observed, “In pursuance of the goal of Health for All by the year 2000, through primary health care [...], small scale CHW programmes have been converted into large scale programmes. This has often been done hastily, resulting in some loss of flexibility and commitment at the local level” (33). In this regard, she recommends learning from other sectors’ experience with community-based workers, with special emphasis on agricultural extension workers.

⁴ The RRA concept derives from a 1970 initiative originated by R. Chambers (1983) as development practitioners acknowledged “the failure of formal data collection methods (particularly questionnaire surveys) to generate cost-effective and reliable data which could be used when planning projects” (30).

⁵ Taking into account that a high number of large-scale or national CHW schemes receive government support (e.g. salaries for CHWs).

On the other hand, discussion of CAH systems focuses on the institutionalisation of the programmes and workers (10, 14, 34), seeking to integrate these initiatives into a wider AH policy. This arises from concerns related to CAHWs role in containing livestock epidemics and derived economic and trade implications (35), raising questions first about the definition of CAHWs and the performance of CAH systems and, secondly, about their reliability. To whom should they ultimately be accountable?

Figure 1: Main differences in the evolution of PHC and PAHC



What is a CAHW?

McCorkle noted that CAHWs "go by almost innumerable names in the literature. 'Barefoot vets' was one of the first [...], modelled on China's barefoot doctors. Others include: paravets, basic veterinary workers, village vets, (village) animal health workers, herder auxiliaries/agents, community animal first aid workers, community veterinary agents, or (community) animal health volunteers/attendants/assistants, settlement livestock carers, village keymen or village scholars [...] veterinary scouts or 'vetscouts'" (36). The variety of names reflects not only the diversity of tasks these workers perform, but also the type and length of training they receive. Yet, as for the human health counterpart, it is important to highlight that "the earliest programmes were indigenous attempts to meet local needs" (33).

Although no equivalent to the Health for All PHC goal exists in the AH sector, both sectors' definitions of a community-based worker are strikingly similar. Although the community-selection criterion was omitted in the earliest definitions of a CHW (illustrating the different evolution of PHC and PAHC as seen in figure 1), in the late 1980s CHWs were "described as people who were selected by the community, resident

in the community and were from the community” (emphasis made by the original author [33]). It was, however, stipulated that a CHW was “a person from the community who is trained to function in the community in close relationship with the healthcare system” (37). Walt (33) pointed out that this definition continued to change and emphasis was placed on the workers’ professional status. Hence, Berman *et al.* (38) stated in 1987 that “they may be volunteers or receive a salary. They are generally not, however, civil servants or professional employees of the Ministry of Health” (analogous statements were made by other authors; see [39, 40]).

Similarly, in the current decade, CAHWs are seen as people who “live and probably grew up in the community concerned. The CAHW is known and respected in the community, is recognised as a knowledgeable livestock keeper, and was selected for training by the community” (41). Moreover, (s)he does “not receive a salary from the state, but for a limited time is given money through the nongovernmental organisation’s programme. The aim of the CAHW is to make a living by selling his or her livestock services, and for the programme to become self-sustaining” (42).

However, in both human and animal health settings, community workers may be seen, as labelled in the HH field, as “change agents” enabling people to organise themselves and improving knowledge at community level (24, 31, 43). Berman (38) pointed out that “CHWs are more than just a health services technology. They are the reflection of a political struggle to change the emphasis of rural health systems.” Skeet in 1984 (27) emphasised that putting development goals first means that “the main orientation of health workers is directed to community development that includes healthcare, rather than to healthcare alone”. Additionally, Bender (44) highlighted that “if priorities have been established by the community, it might very well be that activities directly associated with ‘health’ are not as high a priority as, say, agriculture, water development and income-earning activities”.

The definitions above illustrate the different evolution of the two sectors. Yet, central to both types of community-based systems are the criteria by which initiatives should be evaluated.

Walt (33) states in her review of CHW programmes that an alternative way of defining community workers is to examine the tasks and functions they perform in the community and evaluate how effective they are. As in the HH literature, the CAHW activities detailed in the literature are similar throughout the survey. Clinical work and sale of drugs are the main tasks undertaken by community workers in the AH field, probably because the workers' earnings generally heavily rely in such activities. They do not perform prevention or extension services as often as would be expected or desired.

However, evaluations of health systems, or their sub-components, are generally based on established criteria such as (i) equity, (ii) efficiency, (iii) accessibility of services, (iv) quality of services, (v) human resources and (vi) financial resources. This study will consider these criteria in the context of CAH systems viewed as the delivery branch of a national animal health service. However, it should be noted that the compartmentalised criteria presented here to facilitate analysis interact in practice. Thus, for example, issues regarding equity may affect efficiency as well as accessibility of services.

Equity

The equity criterion in a health system evaluation may be interpreted in several ways⁶. In health economics, as stated by McPake *et al.* (45), "equity might imply equality of: (1) expenditure per capita, (2) inputs per capita, (3) inputs for equal need, (4) access for equal need, (5) utilisation for equal need, (6) marginal met need, (7) health"⁷. Similarly Kutzin (46) points out the several dimensions of equity such as "equity in finance", "equity in receipt of care" and "equity in health status". Mossialos *et al.* (47) characterise equity in terms of vertical equity (i.e. equal payment for equal needs, thus relating to the progressivity of the system) and horizontal equity (i.e. equal services for equal needs). The debate on equality has been brought forward by Muurinen and Le Grand (48), especially regarding equality of access in human health. The definition chosen for the analysis of a health system or its sub-component will depend on the health policy objectives of the system.

Equity boils down to fairness in a given system (49). If the policy objectives of CAH systems are to make AH services readily available and affordable to poor livestock keepers in rural and remote areas, equity may be analysed according to vertical and horizontal definitions.

Vertical equity

Vertical equity in a CAH system asks if the system is progressive or regressive – that is, whether or not poorer livestock keepers pay less for the same services than those who are better off. Several studies have pointed out that most poor livestock keepers are willing to pay (WTP) for animal health services (50-52). In a hypothetical perfect market, WTP may accurately represent consumers' estimation of the benefits for any given distribution of income. In economics literature, WTP entails the ability to pay (ATP) for a good or service. In health economics, the two concepts are often dealt with separately, mostly because of market failures, especially those caused by information asymmetry in the healthcare sector. Indeed, McPake *et al.* highlight that

⁶ Equity in access will be elaborated later in this section.

⁷ It can also be argued that some of these definitions of equity may be equivalent to those used for the allocative efficiency criterion when need is defined as 'capacity to benefit' (45).

“there are objections to using estimates of willingness to pay as measures of benefits [derived from a service or good], not least because willingness to pay is closely related to ability to pay” (45). Because the animal healthcare market presents similar market failures as the human health counterpart (1), the same doubts arise regarding how representative the WTP is as the user’s measure of benefits in animal healthcare. When focusing on vertical equity the debate is thus concerned with ATP.

Most CAH systems are based on a fee-for-service (FFS) payments. We assume that this type of payment method causes vertical inequity as payment is not geared to income. Thus poorer households tend to spend a greater share of their income on services than those who are better off. Several of the studies reviewed here point out that richer livestock keepers tend to receive more services from CAHWs than the others. This is the case for example in Peru (25), India (Orissa) and Kenya (50). Although CAHWs charge much less than a private veterinarian, poorer households are often reluctant to seek CAHW services because of their low ATP. Several mechanisms have been informally implemented to overcome this hurdle such as payment in kind (26), delayed payment or even adjusting fees according to users’ income⁸ (M. Upton, personal communication). These mechanisms may be seen as exemptions designed to counter the vertical inequity arising from an FFS delivery system. Such exemptions have important implications, however, on the economic viability and sustainability of the CAH system.

Horizontal equity

Inequity may also arise when the principle of ‘equal treatment for equal need’ is not satisfied. Horizontal equity refers not only to equal medical treatment for equal need, but also to utilisation (e.g. equal CAHW time spent for equal need) or access⁹ (e.g. equal waiting time for equal need).

As previously mentioned, CAHW schemes have generally been implemented by several NGOs in the field. Government collaboration or coordination is not always present, though it is more likely in Asia. The fact that several agencies train workers leads to differences in curricula and training period. For example, whereas in Cambodia (13) VAHWs are trained for six months, in Peru (25) training lasts only 26 days (or 290 hours).

CAHWs’ knowledge may vary greatly between countries, but here our focus is on variations within a country or even within a district. Horizontal inequity may arise when two livestock keepers in the same country have the same animal health problem but, because CAHWs are trained differently, receive greatly different treatment (which also has efficiency implications). Horizontal equity thus needs to be analysed when evaluating the scaling up of community-based animal health activities. A standardised curriculum for CAHWs at a national or district level (depending on the degree of decentralisation of the country) would thus be desirable for satisfying equity. Suggesting a standardised curriculum will, however, encounter difficulties at the professional level, as there will be pressure from other AH professionals, and at the implementation level, as the reality is that NGOs working in a given country implement different CAH models and so apply different curricula.

We will discuss the latter case in section 4.3. With regard to the former, although some aspects will be addressed with the issue of institutionalisation (section 4.1), similarities arise with the HH counterpart. Thus, even if some members of the veterinary profession have resisted the trend towards CAH, the original idea often came from progressive members of the profession who promoted the idea of CAHWs and persuaded policymakers and politicians to support CAH systems. Nonetheless, the

⁸ This has also been illustrated in the human healthcare field (53).

⁹ Equity in access will be dealt in section 3.3

involvement of other professionals in the AH field should not be overlooked if systems are to be sustainable. Involving other AH professionals such as animal health assistants (AHA) or technicians (AHT) is important, especially as CAHWs may aspire to these professions.

However, the trade-off between equity and efficiency is not always easy to delineate. Hence, as mentioned by McPake *et al.* (45), considering perfect market efficiency will certainly conflict with the equity criterion if the theory of the 'second best'¹⁰ is not taken into account.

Efficiency

In the HH context, there has been a wide debate concerning how efficient the PHC approach and workers are. There are two schools of thought, one labelled 'comprehensive primary healthcare' that concentrates on the processes of health development, and another labelled 'selective primary healthcare' that focuses on identifying and transferring "specific, effective and economical technologies designed to reduce disease" (54). In 1986 Rifkin and Walt (54) weighed these two approaches to PHC in relation to their underlying assumptions and expected objectives regarding efficiency in health improvement.

Selective PHC was first introduced by Walsh and Warren (55) when they proposed a concrete methodology for tackling the most prevalent diseases in developing countries with a limited budget. The concept was appealing for its cost-effectiveness but was criticized by authors such as Gish (56) and Berman (57) mainly because it ignores arguments of development economists regarding "the role of healthcare and its relationship to increased production" (54).

Conversely, comprehensive PHC sees PHC as a tool for community development that works in concert with other sectors. As stated by Mahler (58), "Action undertaken outside the health sector can have health effects much greater than those obtained within it." Rifkin and Walt (54) thus conclude that "health is not merely a disease problem but a development problem". The critical difference between these two viewpoints lies in the control of inputs and outcomes of health improvements and on what timeframe is deemed realistic to achieve the expected results.

Similarly, in the AHS delivery sector, PAHC may be understood as merely a tool for disease control or eradication, thus focusing exclusively on animal health inputs and outcomes. However, as mentioned in section 2.2 and following the HH concept of comprehensive PHC, the PAHC approach may alternatively be understood as a way to promote rural development. Under this broader objective, PAHC would pay special attention to increasing animal productivity while reducing the related public health risk and ultimately enabling economic growth in rural areas through marketing of livestock and livestock products. However, market failure exists at several levels in the AH sector, and failures are especially acute in rural settings. We have set out the reasons for failure in the animal healthcare market elsewhere (1). However, even taking into account these constraints, maximising efficiency remains one of the main objectives in AH markets, and community-based workers are seen as a means to mitigate some of these failures.

CAH systems may thus be viewed through two different prisms in terms of efficiency. If we understand CAH systems and their workers as promoting animal health, the concern is their technical efficiency. If they are seen as a tool for rural development, the focus is on allocative efficiency.

¹⁰ The theory of the 'second best' "states that if there is an unavoidable distortion somewhere in the economy, then perfect competition in any one market may not be efficient" (45).

Allocative efficiency

In a perfect market, resources are supposed to be optimally allocated through market forces. An allocation is Pareto efficient “for a given set of consumer tastes, resources and technology, if it is impossible to move to another, better allocation which could make some people better off and nobody worse off” (59). In practice, though, resource allocation generally involves equity-efficiency trade-offs. An important policy issue at the allocative level is thus how priorities are set for the allocation of the scarce animal health resources. Therefore, allocative efficiency in the context of AHS requires evaluating if an activity is worth pursuing.

In human health, using CHWs as part of the PHC approach was adopted at a highly institutional level under the assumption that it would be an efficient way to allocate resources to improve rural population’s health. The main aim was to provide “‘essential’ healthcare to individuals through their first level of contact with a national health service [which commonly is] a rural health worker” (60). It was thus assumed that PHC was an efficient means to deliver health outcomes to rural areas. Yet, as mentioned earlier, CAH systems started when no such community PHC equivalent existed and without a stated overall objective. The AH literature therefore offers an array of perceived objectives of CAH systems. Examples abound and, as outlined by Martin Curran and McLehose (42), vary from improving human nutritional status through increased animal production (61) to more focused objectives such as reducing animal disease incidence or mortality (15, 16, 25, 62).

Ethical implications in CAH systems evaluations would seem to be lower than in HH. However, methodological difficulties in designing scientific evaluations satisfying standards both quantitative (epidemiological data) and qualitative (social science) are important. Assessing variations in the incidence of animal mortality or disease may be a way to evaluate the effectiveness of CAH systems, but designing evaluation procedures that demonstrate the impact CAH systems have on human nutrition, health or welfare is notoriously difficult. However, it seems to be assumed that increasing animal health and productivity has positive externalities such as improving human nutritional status and welfare. This falls into the broader definition of AHS that has been elaborated elsewhere (1) and in the concept of PAHC as a development tool.

Technical efficiency

Once an objective is known or assumed to be worth pursuing, technical efficiency looks at the best possible way in which the service can be provided (49). Technical efficiency therefore involves effectiveness evaluations as well as cost calculations. Once the alternatives are assessed following these two parameters, an efficiency choice may be taken. Unlike allocative efficiency, technical efficiency depends on several factors that may not be directly related to the source of funding. However, these evaluations may in turn have implications over allocative efficiency.

Effectiveness evaluations, or impact assessments, of CAH systems may focus on parameters such as mortality reduction, infectious and parasitic disease reduction (62) or even the numbers CAHW visits or the extent of services requested. When viewing CAHWs as an ‘animal health technology’ it is important to think about the context in which they develop their activities. The animal healthcare market in rural and remote areas is heavily undermined by several market failures. Of special interest to CAH systems is the lack of infrastructure and information. Distance to animal health centres and/or animal health professionals hinders access. CAHWs may thus be seen as a tool to reduce transaction costs caused by distance as well as to reduce, to some degree, information asymmetry. Thus, as reported by Catley in reference to East Africa, “There is evidence to show that CAHWs not only treat large numbers of livestock but they can also act as effective reporters of disease outbreaks” (5). Similar conclusions may be reached in other regions such as Latin America (25) and Asia (13, 23). However, a bias may exist in the literature as few articles state uncertain or

negative outcomes of CAH evaluations (e.g. Ghana [26]). Blanc *et al.* (63) noted several criticisms of existing evaluations of efficiency in improving animal health. As previously mentioned, the effectiveness of CAH systems may also consider broader impacts such as on the nutritional status of villagers. However, studies exploring this area are not as numerous as evaluations of the technical constraints.

Turning to costs, several techniques may be used to analyse costs associated with animal health interventions¹¹. In human health, some of these techniques are highly controversial given that at some stage an economic value needs to be put to a human health condition (e.g. disability-adjusted life years). Recent events have highlighted the negative externalities possibly arising from animal production (e.g. avian influenza and severe acute respiratory syndrome [SARS]). These events reveal the lack of broader economic evaluations of animal health interventions and, thus, of CAH systems. Broader evaluations would include the spill-over effects of animal disease in terms of, for example, human healthcare costs, international trade bans, higher husbandry costs, and loss of livelihood for small producers. The choice of the variables included in the analysis will heavily influence the results. Such analyses may also serve as guidance for the government's financial resource allocation. Thus, technical and allocative efficiency are not always easy to separate.

The literature shows that impact assessment has generally focused on livestock health (i.e. technical efficiency), and not on the broader objectives stated for CAH systems (i.e. allocative efficiency), as the latter may have broader development policy implications.

Accessibility of services

One of the goals driving the PHC approach was particularly to increase clinic-based services. According to Berman *et al.*, "CHWs are expected to reduce both accessibility and acceptability barriers to increasing service utilisation" (38). An important feature for human health services, accessibility may be an even greater challenge in the case of AH in pastoral or nomadic communities. Yet, service accessibility has several dimensions (some of which have been dealt with in section 3.1.1) that are generally associated with transaction costs. These are: (i) physical distance to animal health centres including uneven access of workers to transport and (ii) social distance¹².

Physical distance

Leonard points out that distance is a deterrent to accessing AHS, observing that "animals, especially large ones, do not have access to the buses and taxis that carry human patients over considerable distances in their search for appropriate medical care" (64). CAHWs are seen as a way to make AH service readily available to smallholders in rural and remote areas. In the absence of these workers, the livestock keeper has to walk the sick animals a long distance to reach animal healthcare. He or she may be more inclined to sell the sick animal than let it lose value in the course of a journey to the AH centre. Such behaviour may also have public health implications.

However, regional differences exist as some Asian countries (e.g. India and Bangladesh) have developed village veterinary centres (52) that are equivalent to primary healthcare centres in HH. African-style pastoralism is not widely practiced in Asia. Additionally, infrastructure is generally less developed in Africa. Thus, for example, in pastoral areas in Ethiopia (62) and Ghana (26) CAHWs are an important

¹¹ These are, for example, cost-effectiveness analysis (CEA), cost-benefit analysis (CBA), cost-utility analysis (CUA) etc.

¹² 'Social distance' here includes differences in access due to gender, wealth, ethnicity and educational variations between herders and workers.

asset in reducing physical distance to AHS and hence decreasing inequalities in access to AH services. In Latin America, smallholders tend to be sedentary, but geographical distance to animal health centres has been highlighted as an important constraint that can be mitigated by CAHWs (11, 25).

Though CAHWs may be present in rural and pastoral areas, transport is key to enabling them to reach remote locations. Besides improvements in infrastructure and transportation, transaction costs associated with distance led Woods (65) to state that a clear distance gradient in the use of AHS exists in Zimbabwe. Similarly, a study in pastoral areas in Kenya observes that livestock keepers perceive more transport options as a way to improve CAH service delivery (6). Similar examples may be found in Sudan (North and South Kordofan) (20), Cambodia (13) and Thailand (66).

Social distance

Physical distance and lack of transport are not the only factors limiting access to AHS in rural and pastoral communities. Social distance, understood as differences in access to services due to gender, wealth (discussed in section 3.1.1 as vertical equity), ethnicity and educational variations between herders and workers may play an important inhibiting role (65).

Several studies of CAH systems have shown that men and women use CAHWs' services differently. As Chipeta *et al.* (50) noted, "Within traditional power structures of male dominance it is highly unlikely that community-based services alone can secure equal attention to men and women." In Kenya (6) it has been pointed out that communication between male CAHWs and female villagers is generally lacking. Women in this setting tend to consult relatives or other women when AH problems arise. Similarly, in Peru, a CARE-led CAH initiative in Puno (25) showed that women are not generally allowed to participate in training courses even though they spend the most time with the animals are thus well placed to recognise animal ill-health early. Analogous examples may be found in other geographical areas. Although other studies have not mentioned these constraints (e.g. Ghana [26]), such behaviour illustrates that socio-cultural barriers may hinder access to AHS and knowledge at the community level.

Differences in ethnicity and educational level may also inhibit access to services and knowledge both in the human (67) and animal health fields (6, 25). A study in India (Orissa) for example (68), pointed out the difficulty in training women as community link workers (CLWs) because of their lack of education. The authors noted that "the role of a CLW is very untraditional for women" and that "they must be trained additionally and they must be provided with confidence-building measures" (68).

Following analysis of the physical and social factors that reduce access to animal health services at the community level, we also need to question the quality of CAH services that are successfully made available.

Quality of services

CHWs' ability to provide basic healthcare has generated a wide debate in the HH literature (38, 69). Similar concerns arise in the AH field with regard to the quality of services CAHWs deliver to livestock keepers. What constitutes quality of service varies greatly between studies but is usually associated with the sale and / or application of drugs. The same criteria may be applied to the tasks performed by CAHWs.

Quality of medicines

Selling drugs is one of the main activities of CAHWs, especially when their income derives from it. Questions have been raised regarding the quality of the drugs and

their administration (i.e. dosages) because of the possible economic and public health implications (70) (i.e. antibiotic resistance and residues).

Selling drugs is one of the activities that CAHWs perform that is readily subject to the agency relationship. Given that CAHWs' income heavily relies on selling drugs, community workers may be inclined to increase their income by selling more, thus undermining their own integrity (70, 71). Furthermore, livestock keepers tend to choose provider and drugs on the basis of cost and do not generally value intangible services (71). It is common to observe smallholders buying from pharmacies, peddlers or black markets and administering drugs without knowing the correct dosage or the quality of the drug. This may contribute to antimicrobial resistance and have public health implications. However, several studies have pointed out that community members recognise that drugs sold by CAHWs are of better quality than those available on the black market (62).

Quality of activities performed

Studies (e.g. Kenya [6]) have pointed out that policymakers and practitioners in the animal health field tend to doubt the quality of the services provided by CAHWs. It is generally held that short and variable training periods and lack of refresher courses prevent CAHWs from performing quality work. However, Rubyogo *et al.* (72) evaluated CAHWs' performance in Mwingi District (Kenya) when undertaking several tasks. The study outcomes were positive. Likewise, Dasebu *et al.* (70) conclude in relation to CAHWs and drug administration in a research in Ghana and Mozambique that incorrect administration of unregulated drugs was reduced by the presence of CAHWs.

The quality of services provided has also been associated with workers' qualifications. A study in pastoral areas of Kenya showed that community members often say they would like workers to show certification that they have been officially trained (6). Similar experiences have been reported in Peru (25), Sudan (Kordofan [20]), Ghana (26) and Nepal (22). Official certification of CAHWs is usually closely linked to the recruitment and selection process.

Human resources

Three main aspects need to be analysed when focusing on human resources for CAH systems. These are workers' remuneration and supervisory, the qualities on which CAHWs are selected and the actual selection process. We will address the issue of remuneration and supervision of community workers in section 4. Here the study will concentrate on the two other issues.

Qualities

Ruebush performed an extensive analysis of the ranking of qualities desired by community members and policymakers in relation to community malaria workers in Guatemala (73). A similar study in Kenyan pastoral areas in the AH field used the same methodology adapted to the African setting (6). Though conducted in different areas, both studies found that trust and commitment were the qualities ranked first by villagers, while policymakers prioritised education and training. Similar qualities were put forward by community members in CAH projects in Peru (25) and Ghana (26). Table 2 shows the differences in desired qualities of CAHWs between community members and policymakers in Kenya.

It is argued that ideal qualities of workers identified by community members play an important role in the sustainability of community-based systems in both the animal and human health sectors, as the community's acceptance of the worker is critical in the sustainability of service delivery in rural areas. Taking into account that the

criteria prioritised by livestock keepers tend to be personal characteristics instead of the technical ones sought by policymakers (6), the process by which community workers are selected is likely to be highly influential.

Table 2: *The qualities community members and policymakers desire regarding community-based workers in the animal health field (source: [6])*

	Policymakers	Community members
1	Literate Trainable/Knowledgeable	Trustworthy
2	Ethnic to/ knowledge of the area	Committed
3	Trustworthy	Responsible
4	Available	Knowledgeable
5	Commitment	Literate

Selection process

The criteria by which CAHW candidates are selected and the selection process itself are fundamental for the long-term sustainability of a CAH system. Several studies have shown that community members would like to see clearer guidelines for the process. It is often said, both in human and animal health, that the influence of elders, wealthier community members, and clan or kinship ties are likely to lead to an unfair selection of workers (6, 20, 73). A. Catley and T. Leyland are among the authors who have pioneered the use of participatory techniques during the implementation process of CAH systems (41).

However, the sustainability of a system does not exclusively rely on workers and their selection procedures. Essential to the sustainability of CAH programmes is the continued availability of financial resources to keep them active over time.

Financial resources

As mentioned in section 2.2, CAHWs are expected to earn their living, at least in part, and replenish their drug kits by charging for services and drugs sold to livestock keepers. In HH, given governments' political commitment to the PHC approach, financial support to CHW systems has often been readily available. CAH systems may, however, be assessed under two highly intertwined criteria: economic viability and financial sustainability.

Economic viability

In community-based systems, economic viability depends on the immediate availability of funds to pay for services and thus relates to vertical equity and the principles of WTP and ATP. In that regard, it is important to highlight that most CAH systems run on FFS payments. Given that CAHWs generally derive their income from selling drugs, cash availability to make the system sustainable is key. Furthermore, as in HH, community workers' reputations strongly depend on the availability and quality of the drugs they sell. Cross *et al.* (74) mentioned in the HH context that

“pharmaceuticals [...] are essential for preventive and therapeutic health services. In addition to their direct health impact, the effectiveness of pharmaceuticals against most common diseases serves to establish the credibility of health workers that they need to promote long-term health improvements.” Given the importance of drugs, several schemes have been tested in the PHC context to enhance economic viability in selling drugs, the most notable being revolving drug funds (RDFs).

Most articles describing the reviewed CAH systems include this mechanism as central to selling drugs and kit replenishment (e.g. Thailand [12], Malawi [16], Somalia [5]). In the HH field, one of the fundamental principles of PHC was that health services should be free in rural areas. RDFs were implemented at a later stage when it became clear that governments in developing countries could not afford to pay for the drugs used in community-based health schemes. Conversely, as PAHC is driven by economic and not ethical objectives, CAH systems did not receive financial support from governments. RDFs were thus seen as an appealing business-oriented approach to CAH service delivery in rural areas. However, hindrances to the functioning of these schemes are highly similar between the two health sectors. Adapting from Cross *et al.* (74), frequent constraints include:

- i. inaccurate estimation of cost of capitalization and lack of accurate management and financial planning,
- ii. failure to collect payment and/or delays in cash flow that undermine the replenishment of drug stocks,
- iii. drug prices below replacement costs,
- iv. lack of capital funds when there is rapid programme expansion,
- v. losses related to theft and deterioration,
- vi. price increases (e.g. due to inflation).

Common to both sectors is that “the monies actually recovered are insufficient to replenish the original drug stocks and the fund is soon depleted or ‘decapitalised’” (74). In the PHC literature it is commonly stated, as by Cross *et al.* (74), that “one of the most important [factors for the failure of RDFs] appears to be a resistance to thinking of the fund in business terms”. Similarly, in the AH field it is generally acknowledged, as by IFAD (20), that “many villagers are still reluctant to pay for the services provided to them by the CBAHW [community-based AHW], because they understand them as employees of the government” and thus expect services to be free. Similar findings were obtained in pastoral areas in Kenya (6), Zambia (75) and Ghana (26).

Alternative mechanisms such as membership organisations within CAH systems have been implemented in other regions, including Peru (25), Cambodia (13) and Kenya (76, 77). They receive different names as the type of organisation varies between settings. Thus in Cambodia these are “VAHWs associations pharmacies” and in Wajir (Kenya) “pastoral associations”, but detailed information of their functions, membership fees and services are generally lacking. For instance, in Peru the Asociación de Sanitarios Ganaderos (25) was created mainly as a negotiating platform to obtain drug price discounts.

FFS continues to be the most widely used payment method in CAH systems. As discussed in section 3.1.1, FFS is likely to affect the equity of the system, and livestock keepers’ unwillingness to pay for services that used to be free (or paid late or in kind) may heavily undermine CAH systems cost-recovery and sustainability objectives.

Financial sustainability

Whereas economic viability refers to immediate availability of funds, financial sustainability focuses on the flow of funds in the long run. We have discussed elsewhere funding mechanisms and options for animal healthcare systems (2). These should be matched with population's needs. In 1983, Segall (78) looked into governments' resource allocation methods for PHC and highlighted the intertwined nature of planning and politics in the promotion of national PHC policies. Interestingly, he pointed out that budgetary systems should identify expenditures by geographical areas and level of care. He emphasised that "resources should be allocated geographically to reduce health inequalities through the provision of appropriate mix of different levels of care".

Similar reasoning may be applied to PAHC. In countries where the livestock sector's share of agricultural GDP is large, funding mechanisms help enhance the government's capacity to generate sustainable and more predictable budgets to be allocated for AH. This makes nations less dependent on foreign aid when, for example, epidemics spread in their livestock population. Here, as with PHC, depending on the political balance between poverty-reduction and economic-growth objectives, governments may be interested in allocating resources¹³ to the most deprived areas in their countries¹⁴. Yet, in contrast to the HH field, AH has greater NGO involvement in AHS delivery in rural and remote areas through CAH systems.

The literature review shows that NGO-government collaboration in the implementation of CAH initiatives is common in Asian countries (e.g. Nepal, Thailand). In this region, financial support from the government is generally offered during the initial phases for training as well as for the first drug kit. In other areas, drug kits and training are organised by the NGO itself. Financial sustainability remains, however, one of the focal points in exclusively NGO-led CAH programmes as system sustainability usually ends when the NGO withdraws. Financial sustainability in these cases is closely related to access to credit schemes in order to maintain the RDFs or simply to replenish the drug kit. Links to rural finance institutions are thus increasingly seen as a key element for sustainability. Credit, and especially micro-credit, are commonly considered during programme implementation (e.g. Peru [25], Cambodia [13], Sudan [Kordofan] [20]).

¹³ Here 'resources' mainly means public funding of animal healthcare professionals, facilities, transport etc.

¹⁴ The debate on the degree of *publicness* of goods in the animal health sector has already been discussed (1).

SERVICE DELIVERY AT THE NATIONAL LEVEL: SCALING UP CAH SYSTEMS

Previous sections have introduced the concept of PAHC as well as the criteria by which CAH systems should be evaluated. Expanding the reach of CAH systems in rural areas at a national level requires that certain institutional and structural aspects be addressed.

Institutionalisation of CAHWs

Discussion of institutionalising CAHWs started in the late 1990s, but policymakers and other professionals in the AH sector in some countries (e.g. Kenya and Ethiopia) have been more reluctant to acknowledge the potential usefulness of CAH systems than others, for example, in West Africa (79) and Latin America (J. Rushton, personal communication). Indeed, reluctance from the professional community was also recorded during the initial phase of the PHC initiative. In 1987, Berman pointed out that “the existing medical system often [feels] threatened by CHWs and tries to subvert local efforts” (38). Therefore, he added, “where CHWs will become a significant component of the rural health system, they should not threaten any of the existing professionals – for example, the clinical practices (public and private) of nurses, midwives or physicians. Thus the institutional context of large-scale programmes may sometimes work to limit the efficacy of these workers.”

The OIE recommended in early 2003 (35) that, “in order to strengthen animal health and veterinary public health services through improved involvement of [...] para-professionals, including CAHW [...], veterinary administrations [should] build official linkages with service providers, particularly individual veterinarians and veterinary associations, but also with individual para-professionals, nongovernmental organisations and farmers’ groups”. The paper stressed that “linkages between veterinary administrations and private veterinarians and para-professionals take the form of contracts for the provision of specific services such as disease monitoring and surveillance, animal vaccination, food inspection, and disease control”.

West African countries have integrated these workers into the NAHS more quickly, with linkages to either public or private veterinarians (79). Conversely, in Asia workers tend to collaborate more closely with governmental structures (12, 23) than with private practitioners. In Latin America, though, the veterinary profession has not been so reluctant to collaborate with the *sanitarios ganaderos* or *promotores sanitarios* (CAHWs in Spanish) but have rather acknowledged their usefulness (J. Rushton, personal communication). These regional differences are generally closely related to the historical and political background of the region. For example, in West African countries veterinary associations (*ordre vétérinaire*) are generally highly influential, mostly due to the French colonial legacy. However, recent conferences (10) and studies have shown that even those countries (e.g. in East Africa) most resistant to CAH systems and their associated para-professionals seem increasingly willing to accept a “structure whereby the CAHW is linked either directly or indirectly, through an AHA, to the veterinarian” (6). In the AH research community, participatory approaches have long been emphasised as a precondition for the sustainability of community-based initiatives, but linking these programmes to national systems has taken much longer than in HH. At a practical level, such structures are far from easy to implement and monitor.

Many of the factors affecting CAH systems’ sustainability have been analysed in the previous sections. The participatory techniques used in the systems’ implementation are also key and have been dealt with elsewhere (5, 15, 18, 30, 80). The different

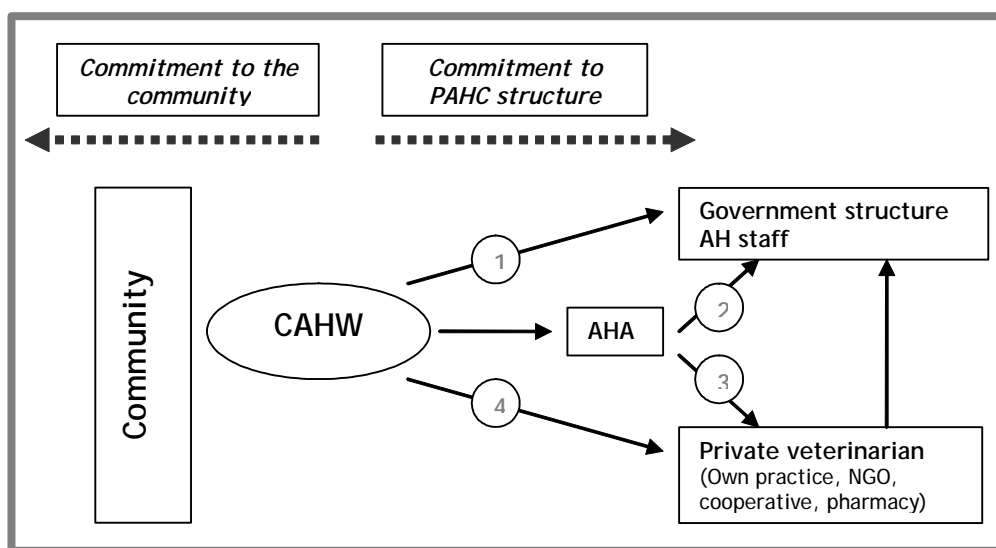
ways in which CAH systems can be structured may affect the balance between worker accountability and system sustainability.

Monitoring models and CAHWs' behaviour

In the HH field, Arrow's agency theory (81) has been extensively applied. Several authors (e.g. Chabot [82], Robinson [40]) have highlighted the difficulties of implementing community-based initiatives. Special emphasis has been given to the incentives and motivation needed to make the system more sustainable as an integral part of a national health structure (27, 40).

When focusing on AH, few studies have addressed the agency relations existing between the actors at different levels of the animal healthcare structure (2, 3, 6, 83). Little AH literature is concerned with agency at the community level. Yet, in the rural setting, if CAHWs (whether involved in private, public or nongovernmental initiatives) are to become an integral part of a NAHS, linkages, roles and responsibilities need to be examined. Figure 2 shows the different types of linkages a CAHW may have in PAHC. These linkages will influence workers' accountability (i.e. to PAHC and the community) as well as the sustainability of the CAH system.

Figure 2: CAHWs monitoring models

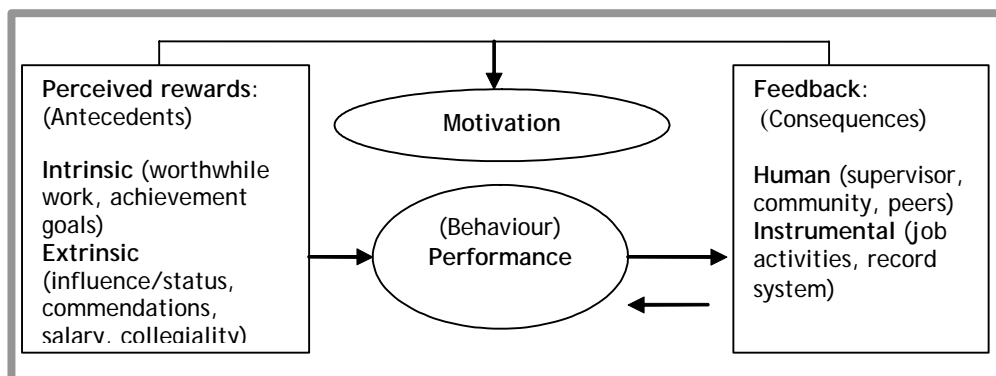


In the field of organisational behaviour research, Steers (84), Cook and Hunsaker (85), and others have pointed out factors likely to highly influence workers' motivation and performance. These include (i) the individual's capabilities and skills, (ii) the need for growth, (iii) rewards and feedback, and (iv) the work environment. Robinson and Larsen (40) applied this reasoning to community-based health systems, highlighting possible impacts on sustainability and accountability. Each of the monitoring models shown in figure 2 may thus affect the behaviour of those involved to the extent of influencing the tasks undertaken by CAHWs.

Robinson and Larsen devised a framework for analysing the elements affecting CHWs' performance and motivation (see figure 3). They stressed that the work environment of a CHW is the community (40) and that the worker is not in daily contact with either

the national health system or the PHC initiative. As a result, they conclude, "It is reasonable to propose that the community, that is, the people to whom the CHW provides services, may have a significant impact on CHWs' job performance."

Figure 3: Conceptual framework for CHW performance and motivation (adapted from Robinson *et al.* [40])



A similar situation arises in the AH sector, all the more so as PAHCs came about more recently than PHCs. In both sectors the worker tends to be more committed to the community. Such commitment is desirable and used as a criterion in the selection process of CAHWs. As previously mentioned, studies have shown that commitment is highly demanded by community members (6). However, although commitment is essential to the sustainability of a CAH system, the worker's perceived rewards, especially earnings, will be highly influential in determining to whom the CAHW is ultimately accountable.

Perceived rewards

When focusing on perceived rewards to community workers, extrinsic and intrinsic factors need to be analysed.

Robinson and Larsen (40) counted among extrinsic rewards social status and salary/earnings. The latter has been widely discussed in community-based programmes. Bender *et al.* (44) noted that "the issue of payment for the VHW [village health worker] is important from the perspectives of motivation and accountability". They add: "Who pays the VHW (the state or the community) will determine to whom he is accountable. Payment by the state may signify greater commitment to PHC by the government, but it also could mean a lesser commitment to the community by the VHW." Yet, "financial support from the community itself is advantageous because it promotes community participation and gives a feeling of responsibility over meeting their own health needs." CHWs were, however, seen from the beginning as an integral part of a national policy on PHC and thus accountable to that structure.

Bearing in mind the different origins and objectives of PHC and PAHC, in both fields the issue of payment versus voluntarism of community workers has been widely debated (HH [33] and AH [80, 86]). CAHWs are supposed to make their living from the services given to the community at the same time that they are supposed to be accountable, directly or indirectly, to the government structure¹⁵. Some of these tasks are inherently contradictory, especially when comparing preventive and extension services to the CAHWs' main source of livelihood (e.g. curative services and drugs sold). These contradictions threaten the systems' sustainability.

¹⁵ Given their role in disease surveillance in rural areas.

Walt (33) found that HH volunteers seemed to be acknowledged as the best alternative to PHC. However, voluntarism depends on economic security and available time, conditions that are not generally met in developing countries. Rural and pastoral populations are heavily burdened with subsistence tasks. Additionally, volunteering is perceived “as an avenue to paid work”. Walt pointed out that “the reality is that most national programmes pay their CHWs either a salary or an honorarium, that almost no examples exist of sustained community financing of CHW [...], and that NGOs tend to find ways of rewarding their CHWs”. Sholl also raised doubts regarding “whether non-financial rewards are sufficient to maintain the [CHW] devotion to the job” (39). Similarly, CAHWs are generally motivated by the chance to get a job. “High attrition rates amongst volunteers as well as amongst CHWs whose remuneration fails in some way [... suggest] that a national programme that relies on volunteers or on the community supporting their CHWs is likely to fail” (33) – an assumption that also applies to CAH. However, other reasons existed in the HH field to consider voluntarism as an alternative. Thus, “in some countries, both developed and developing, volunteers are perceived by policymakers as a stop-gap, or an alternative to government expenditure” (33).

Volunteers were not considered the ideal option for CAH. The reason probably lies in the participatory origin of PAHC and its economic focus. Thus, while in the late 1980s, a decade after the start of PHC, the HH research community began evaluating the effectiveness of voluntarism in CHW systems (39), CAH research was already focusing on alternative ways to encourage CAHWs to remain active.

Intrinsic rewards, on the other hand, focus on the worker’s personal achievement goals. These are more difficult to evaluate. According to Cook and Hunsaker (85), “Intrinsic rewards postulates that motivation is moderated by perceived fairness or discrepancies between contributions and rewards.” Social and cultural reasons, for example, have been cited as sources of motivation for workers (31) under this category. However, intrinsic rewards are closely related to and highly influenced by feedback mechanisms.

Feedback

As seen in figure 3, feedback, the second factor influencing community workers’ motivation and performance, is classified as ‘human’ and ‘instrumental’.

Regarding ‘human’ feedback in HH, “high level job performance among CHWs can best be achieved by having a management system, which includes regular contact between the CHW and a local supervisor, a method of evaluating CHW performance and a programme of continuing education” (40). In the AH field, difficulties in monitoring may be greater than in HH, as populations where CAHWs work tend to be nomadic. Catley pointed out that “regarding the need for public sector recognition and supervision of community-based animal health systems to ensure quality of service, even in those countries with well-established government veterinary services there is limited capacity to monitor CAHWs in pastoral areas” (5). In Ghana, for example, frequency of supervision of CAHWs by veterinary staff (and facilitated practical refresher training on an informal basis) varied from weekly to once every six months. Variations in supervision in this case were reported to be due to “a combination of low motivation on the part of one or both parties, and transport constraints” (26). Similar disparities in supervision patterns have been reported in other regions (25).

Regarding ‘instrumental’ feedback, drug supply plays a crucial role. As mentioned in section 3.4, selling drugs is the major source of income for CAHWs. Several studies have pointed out that one of the main reasons CAHWs quit is the lack of drugs or their high price (20). This may be due to non-payment by service users or unavailability of high-quality drugs in the regions. As previously mentioned, the latter poses a high hurdle for CAHWs as it undermines their credibility with villagers. The literature

frequently contains statements such as “paravets were not trusted anymore because their service was insufficient due to their recourse to drugs from the black market, which are of low quality” (20).

When considering the sustainability and cohesiveness of an AHS delivery system at national level, we need to take into account the political context in which CAH structures function.

Governance of PAHC

Central to the implementation of a national AHS delivery system is governance. Some aspects of this have been addressed in analyses of funding mechanisms and options for AHS (2). When focusing on AH service delivery in rural areas, we need to address such governance specifics as the political constraints to equity, as well as public-private partnerships.

Regarding the role of NGOs in HH service delivery, it has been pointed out that, in order “to improve the chances of sustainability, the development of coalitions between NGOs and government services is a highly desirable way to promote sustainable development” (87). Catley (19) however notes, in AH “experience to date indicates that inappropriate government policy has been a major constraint to the effectiveness, coordination and sustainability of the CAHW approach. Policy reform with respect to CAHW roles and public-private sector division of veterinary activities is taking place but progress has been slow.” Indeed, Catley found that “many of the most dramatic examples of CAHW effectiveness have emerged from areas where in reality, there is no government”, such as Somalia, southern Sudan and Afar. This illustrates how in certain areas NGOs are able to coordinate their efforts and objectives in terms of CAH projects to create a comprehensive and cohesive system. Nevertheless, the literature review shows that, in other settings such as Asia and Latin America, collaboration between government authorities and NGOs has been much more common.

Indeed, broader public-private cooperation is needed. Linkages between stakeholders such as farmer associations, cooperatives and the pharmaceutical industry should be strengthened. Research in East Africa on the economic viability of four different models of CAH systems concluded that the most viable model in remote areas was a pharmacy or clinic owned by a AHA or AHT and manned by a network of CAHWs. AHAs and AHTs were regulated by government veterinary staff (88). Although doubts have been raised about the economic viability of farmer or pastoral associations, these platforms strengthen farmers’ voices in the policymaking process (89).

CONCLUSIONS AND POLICY RECOMMENDATIONS

Financial stringencies severely constrain the ability of many developing country's governments to provide basic animal health services, particularly in rural areas. Given that the livelihood of smallholders often depends, at least partially, on livestock, lack of access to 'minimum' animal health services increases these peoples' vulnerability. In addition, trade barriers and at times complete export bans undermine the already weak economies of most of these countries.

This review aims to learn from the human health sector's experience in scaling up community-based initiatives to the national level. Ultimately, it would be desirable to develop a comprehensive animal-health scheme to protect rural populations from the spread of animal diseases and enhance productivity in those areas. Although other factors such as infrastructure, access to market and information are crucial to reducing poverty amongst rural smallholders, the review has revealed the need to include CAH systems in a wider animal health policy, drawing lessons from the HH sector.

Organised according to the four stated objectives of study, our conclusions are the following:

Objective 1:

To place community animal health (CAH) programmes within the context of animal health policy.

Community-based animal health initiatives started in the 1970s and 80s as a consequence of structural adjustment programmes imposed on most developing countries. Implementation of CAH systems in rural and remote areas was driven by economic development objectives, as livestock are an important source of livelihood for smallholders in marginalised areas. Unlike in the HH sector, no high-level institutional initiative similar to the *Health for All PHC* approach took place in the AH sector.

At the same time that PHC was implemented, NGO-led CAH systems started growing in rural areas to overcome the lack of AHS delivery and fill the supply gap for these services. While ethical objectives were the driving forces of PHC, economic growth was at the centre of CAH initiatives. And, whereas PHC was perceived by local communities and researchers as top-down, CAH programmes were community generated. While the AH sector lacked institutional focus, the HH counterpart lacked participatory rural appraisal methods to increase community involvement in implementation.

The comparative analysis between the animal and human health sectors highlights gaps in the evolution of CAH systems within the animal health system. These are mainly institutionalisation of CAHWs, monitoring of these community workers, and governance in animal health service delivery in rural and remote areas. CAH systems have thus been put into a wider policy context labelled PAHC to improve current service delivery in rural areas through CAHWs.

Objective 2:

To elaborate the criteria against which CAH initiatives should be evaluated within a national animal health system (NAHS).

Six main criteria have been devised to guide assessment of CAH initiatives within the context of PAHC delivery. These criteria are equity, efficiency, accessibility of services, quality of services provided, human resources and financial resources. Given the similarities between human and animal health service delivery in rural areas, these criteria need to be taken into account when considering the scaling-up to the

national level of community-based programmes. Choices and trade-offs between them will be heavily influenced by political decisions at the national and/or local level.

Objective 3:

To identify regional differences between CAH initiatives.

Although the literature on CAH systems in certain geographical regions such as Latin America and West Africa is relatively scarce, regional differences have been identified. While most of the reviewed initiatives prioritise the sustainability of CAH systems, monitoring models differ. Whereas in Asia most initiatives tend to link CAHWs with government staff, in East Africa linkages are more likely to be established with private practitioners, resulting in significantly lower government involvement than in Asia. It seems, however, that the need to institutionalise CAHWs is now recognised internationally and that reluctant members of the animal health profession, especially in East Africa, are becoming more aware of the potential usefulness of these workers in delivering services in rural areas.

Objective 4:

To elaborate policy recommendations on how to support CAH systems and integrate them into a wider national animal healthcare structure.

Scaling up CAH systems into a nationwide delivery scheme requires support at several levels. Policy recommendations for the national animal health system to strengthen the process are the following:

- Clearly state the overall animal health objectives of the NAHS;
- Facilitate a platform for dialogue between NGOs and existing national structures for coordinating field activities and so obtain more equitable and consistent AHS delivery coverage in rural and remote areas;
- Improve equity in the PAHC system by promoting the institutionalisation and recognition of CAHWs and a standardised curriculum¹⁶ for CAHWs to define training periods and tasks while maintaining enough flexibility to adapt services to the AH needs of different parts of the country.

¹⁶ When these have not already been implemented.

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